

Ants of the Hengduan Mountains: a new altitudinal survey and updated checklist for Yunnan Province highlight an understudied insect biodiversity hotspot

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Abstract

China's Hengduan Mountain region has been considered one of the most diverse regions in the northern hemisphere. Its stunning topography with many deep valleys and impassable mountain barriers has promoted an astonishing diversification in many groups of organisms including plants, birds, mammals, and amphibians. However, the insect biodiversity in this region is still poorly known. Here, the first checklist of ant species from the Southern Hengduan Mountain region is presented, generated by sampling ant diversity using a wide array of collection methods, including Winkler leaf litter extraction, vegetation beating, and hand collection. 130 species/morphospecies from nine subfamilies and 49 genera were identified. Among them, 17 species from 13 genera represent new records for Yunnan province, and eight species are newly recorded for China. Moreover, we believe 41 novel morphospecies (31% of the total collected taxa) will prove to be new to science. These results highlight the rich ant fauna of this region and strongly sup-

port its status as a biodiversity hotspot. The current ant species checklist for the whole of Yunnan Province was updated by recording 550 named species from 99 genera. Taken together, our results suggest that the Yunnan ant fauna still remains under-sampled, and future sampling will likely yield many more species, among them many undescribed ones.

Keywords

biodiversity hotspot; checklist; China; Formicidae; Hengduan Mountains; new records; species

Introduction

The Hengduan Mountain region, located in the southeastern part of the Qinghai-Tibet Plateau, is one of the 35 recognized biodiversity hotspots in the world (Myers et al. 2000). The unique landscape, geomorphology, microhabitat differentiation and geographic isolation created by tectonic uplift during the last eight million years has promoted an astonishing diversification in many groups of organisms, making this region one of the most diverse temperate regions in the northern hemisphere (Boufford 2014; Price et al 2014; Xing and Ree 2017). For example, it harbors nearly 40 percent of China's vascular plant diversity (ca. 12,000 species), including more than 3,000 endemic species (Boufford 2014). However, aside from the well-documented plants and some vertebrates, the diversity of other groups, especially invertebrates in this region remains largely unknown. Insect taxonomic groups in particular have received limited attention, and our understanding of their diversity in the Hengduan Mountains is extremely fragmented.

Ants are an ecologically dominant component of many ecosystems in terms of their abundance, richness, and ecosystem function (Hölldobler and Wilson 1990). Globally, about 15,600 ant species and subspecies have been described (Bolton 2020), making them the most diverse group of social insects and one of the most diverse families of insects. Despite the fact that ant diversity is mainly concentrated within tropical regions (Dunn et al. 2009; Guénard et al. 2012; Economo et al. 2018), the ant fauna of many other regions is still poorly known, especially in Asia (Guénard et al. 2010). Compiling and curating comprehensive and accurate ant species checklists for these regions is essential not only for insights into ant taxonomy and systematics, but also for long-term monitoring and conservation of these ecosystems (Guénard et al. 2017). The goal of this study is to provide a better understanding of the poorly known ant biodiversity in China's Hengduan Mountains. The ultra-variable topography of this region, ideal for creating numerous vicariance events, combined with its wide range of climatic zones has contributed to the exceptional richness of endemic species inhabiting this area. Nevertheless, the rough topography has also made access and exploration rather challenging in the past. Against the background of extraordinary levels of plant diversity harbored by the Hengduan Mountains, it remains unclear whether or not ants and other insects display similar patterns of high diversity and endemism in this region.

To address this gap, we here present the results of an ant biodiversity survey conducted in the Gaoligong Shan mountains (part of the Hengduan Mountains), Yunnan

Province, southwest China undertaken in 2019. Our goal is to present a complete species checklist of ants from the Gaoligong Mountains, including new records, as well as to update the current ant species checklist for the whole of Yunnan Province.

The Gaoligong Shan mountains (lat. 24°56'–28°22'N, long. 98°08'–98°50'E) comprise the western-most part of the Hengduan Mountain Range, and are among the most biodiversity-rich areas in Yunnan (Li et al. 2008; Dumbacher et al. 2011; Lo and Bi 2019). The ant fauna in the Gaoligong Shan mountains remains poorly understood, despite several studies focusing on ant diversity patterns that have recorded 62 ant species from 31 genera (Xu 2001a, b), but lack a comprehensive list of species collected.

Yunnan province is the richest province of China in terms of ant diversity (Guénard and Dunn 2012). The latest ant checklist of Yunnan was compiled almost 10 years ago and consisted of 462 ant species. Since then, new ant inventories have been conducted (e.g. Liu et al. 2015a), as well as new species descriptions (e.g., Guénard et al. 2013; Xu et al. 2014a, b; Liu et al. 2015b; Staab et al. 2018), and the identification of previously dubious records have sensibly modified our understanding of Yunnan's ant diversity and species composition. Therefore, in this study, we also provide an update to the ant species checklist of Yunnan province and discuss future trends.

Materials and methods

Ant specimens were collected from natural forests along an elevational gradient on both the eastern and western slopes of the Gaoligong Mountains in July 2019. We sampled leaf litter ants from 16 sites at roughly 150 m elevational intervals from 600 m to 3000 m, following the standardized sampling protocol developed in Liu et al. 2016. At each site, we established a 400 m² quadrat (20 m × 20 m) and collected leaf litter samples at the four corners of the quadrat (1 m²). We also collected leaf litter within the quadrat to cover a variety of microhabitats. Finally, ants on the ground, lower vegetation, and tree branches were collected both by hand and using a beating sheet. Leaf litter samples were extracted using mini Winkler extractors for 72 hours using the shuffling method described in Guénard and Lucky (2011).

Ant specimens were first placed in 99% ethanol and later sorted into morphospecies and point mounted. Each mounted specimen was assigned a unique Museum of Comparative Zoology, Harvard University (MCZ) specimen code and collection labels. Extended depth of field specimen images were taken with a Leica DFC400 digital camera mounted on a Leica M205C stereomicroscope through the Leica Application Suite V4 software in the Ant Room at the MCZ. Specimens were identified to species / morphospecies using available keys, the digital resources on Antwiki (<http://www.antwiki.org>) and AntWeb (<http://www.antweb.org>), as well as reference museum material. All mounted and alcohol-preserved ant specimens are currently deposited in the Ant Room of the MCZ.

Distribution maps of species were generated from records included within the Global Ant Biodiversity Informatics (GABI) database and available at <https://antmaps.org> (Janicki et al, 2016; Guénard et al. 2017). These maps are based on records reported

at the country level, or at the first administrative division for the larger countries (China, India, Japan). For larger islands that form their own natural biogeographic units like Borneo, Sumatra, New Guinea, the distribution maps used the island boundary instead of political boundaries (see also Guénard et al. 2012).

Results

Ants of the Hengduan Mountain region

More than 3000 specimens were collected during this survey, and 130 species and morphospecies in 49 genera and nine subfamilies were identified. After identification of 88 valid species from the 130 total collected species, a total of 17 new species records are presented for Yunnan province and eight represent new records for China (see Table 1). The newly recorded species belong to 13 genera from four subfamilies. Moreover, the 41 morphospecies that could not be identified are likely to represent new species.

Within the recent collection, the most speciose ant genus is *Pheidole* with eleven species (8.5% of the total species collected in the survey), followed by *Camponotus* (ten species, 7.7%), and *Polyrhachis* (seven species, 5.4%). Other diverse genera include *Aphaenogaster* (6 species, 4.6%), *Strumigenys* (six species, 4.6%), *Tetramorium* (six species, 4.6%), *Aenictus* (five species, 3.8%), and *Carebara* (five species, 3.8%). More details are presented in Table 2.

Here, we present the list of ant species that were collected in the Gaoligong Shan mountains (Table 1), as well as images for each species (Figs 1–136).

Updated ant checklist in Yunnan

The ant species list of Yunnan Province was generated using records from GABI available at <https://antmaps.org> (Janicki et al. 2016; Guénard et al. 2017). In total, the Yunnan ant fauna is composed of 99 genera and 550 named species and subspecies. Among them, the ant genera *Lasiomyrma*, *Lordomyrma*, and *Prionopelta* are only known from unidentified morphospecies. Through our collection and the records from GABI, we have added 125 species and subspecies to the list of ants of Yunnan since the last ant checklist (Guénard et al. 2012). We also excluded 26 species records from the previous list and explained our rationale in each case (Table 3).

In Yunnan, the most diverse ant genus is *Pheidole* with 42 named species, followed by *Polyrhachis* (33 species), *Camponotus* (30 species), and *Tetramorium* (29 species). Other diverse genera include *Crematogaster* (25 species), and *Strumigenys* (25 species). Although 15 ant genera contain more than ten named species in Yunnan, the majority of ant genera occurring in Yunnan seem to be not particularly diverse. For example, 35 genera are represented by only one species in Yunnan (Table 4).

Table 1. List of ant species (Formicidae) in the Gaoligong Shan mountains, Yunnan with their respective illustrations. * New to Yunnan province; **New to China.

Species	Figure
Dorylinae	
<i>Aenictus artipus</i> Wilson, 1964	Fig. 1
** <i>Aenictus brevinodus</i> Jaitrong & Yamane, 2011	Fig. 2
<i>Aenictus hodgsoni</i> Forel, 1901	Fig. 3
<i>Aenictus paracentatus</i> Jaitrong, Yamane & Tasen, 2012	Fig. 4
* <i>Aenictus watanasiti</i> Jaitrong & Yamane, 2013	Fig. 5
<i>Cerapachys sulcinodis</i> Emery, 1889	Fig. 6
<i>Cerapachys</i> sp. clm01	Fig. 7
<i>Chrysapace costatus</i> (Bharti & Wachkoo, 2013)	Fig. 8
<i>Dorylus orientalis</i> Westwood, 1835	Figs 9,10
<i>Ooceraea biroi</i> (Forel, 1907)	Fig. 11
Amblyoponinae	
<i>Stigmatomma octodentatum</i> (Xu, 2006)	Fig. 12
Dolichoderinae	
<i>Dolichoderus feae</i> Emery, 1889	Fig. 13
<i>Dolichoderus squamanodus</i> Xu, 2001	Fig. 14
<i>Dolichoderus taprobanae</i> (Smith, 1858)	Fig. 15
<i>Ochetellus glaber</i> (Mayr, 1862)	Fig. 16
<i>Tapinoma melanocephalum</i> (Fabricius, 1793)	Fig. 17
Ectatomminae	
<i>Gnamptogenys quadrutinodules</i> Chen, Lattke & Zhou, 2017	Fig. 18
Formicinae	
<i>Anoplolepis gracilipes</i> (Smith, 1857)	Fig. 19
** <i>Camponotus bellus leucodiscus</i> Wheeler, 1919	Fig. 20
** <i>Camponotus keihitoi</i> Forel, 1913	Fig. 21
<i>Camponotus lasiselene</i> Wang & Wu, 1994	Figs 22, 23
<i>Camponotus mitis</i> (Smith, 1858)	Fig. 24
<i>Camponotus nicobarensis</i> Mayr, 1865	Fig. 25
<i>Camponotus</i> sp. clm01	Fig. 26
<i>Camponotus</i> sp. clm02	Fig. 27
<i>Camponotus</i> sp. clm03	Fig. 28
<i>Camponotus</i> sp. clm04	Fig. 29
<i>Camponotus</i> sp. clm05	Fig. 30
<i>Formica cunicularia</i> Latreille, 1798	Fig. 31
<i>Formica japonica</i> Motschoulsky, 1866	Fig. 32
* <i>Lasius obscuratus</i> Stitz, 1930	Fig. 33
* <i>Lasius himalayanus</i> Bingham, 1903	Fig. 34
<i>Nylanderia bourbonica</i> (Forel, 1886)	Fig. 35
<i>Nylanderia</i> sp. clm01	Fig. 36
<i>Nylanderia</i> sp. clm02	Fig. 37
<i>Oecophylla smaragdina</i> (Fabricius, 1775)	Fig. 38
<i>Paraparatrechina sakurae</i> (Ito, 1914)	Fig. 39
<i>Paraparatrechina</i> sp. clm01	Fig. 40
<i>Paraparatrechina</i> sp. clm02	Fig. 41
<i>Polyrhachis armata</i> (Le Guillou, 1842)	Fig. 42
<i>Polyrhachis bihamata</i> (Drury, 1773)	Fig. 43
<i>Polyrhachis dives</i> Smith, 1857	Fig. 44
<i>Polyrhachis furcata</i> Smith, 1858	Fig. 45
<i>Polyrhachis halidayi</i> Emery, 1889	Fig. 46
<i>Polyrhachis illaudata</i> Walker, 1859	Fig. 47
<i>Polyrhachis laevigata</i> Smith, 1857	Fig. 48

Species	Figure
<i>Polyrhachis tibialis</i> Smith, 1858	Fig. 49
* <i>Prenolepis angularis</i> Zhou, 2001	Fig. 50
* <i>Prenolepis fustinoda</i> Williams & LaPolla, 2016	Fig. 51
<i>Prenolepis</i> sp. clm01	Fig. 52
<i>Prenolepis</i> sp. clm02	Fig. 53
<i>Pseudolasius emeryi</i> Forel, 1915	Fig. 54
<i>Pseudolasius silvestrii</i> Wheeler, 1927	Fig. 55
Myrmicinae	
<i>Aphaenogaster feae</i> Emery, 1889	Fig. 56
<i>Aphaenogaster</i> sp. clm01	Fig. 57
<i>Aphaenogaster</i> sp. clm02	Fig. 58
<i>Aphaenogaster</i> sp. clm03	Fig. 59
<i>Aphaenogaster</i> sp. clm04	Fig. 60
<i>Aphaenogaster</i> sp. clm05	Fig. 61
* <i>Cardiocondyla itsukii</i> Seifert, Okita & Heinze, 2017	Fig. 62
<i>Cardiocondyla</i> sp. clm01	Fig. 63
<i>Carebara acutispina</i> (Xu, 2003)	Fig. 64
<i>Carebara affinis</i> (Jerdon, 1851)	Fig. 65
<i>Carebara altinoda</i> (Xu, 2003)	Fig. 66
<i>Carebara bihornata</i> (Xu, 2003)	Fig. 67
<i>Carebara</i> sp. clm01	Fig. 68
* <i>Cataulacus marginatus</i> Bolton, 1974	Fig. 69
<i>Crematogaster quadriruga</i> Forel, 1911	Fig. 70
<i>Crematogaster</i> sp. clm01	Fig. 71
<i>Crematogaster</i> sp. clm02	Fig. 72
** <i>Dilobocondyla eguchii</i> Bharti & Kumar, 2013	Fig. 73
<i>Gaoligongidris planodorsa</i> Xu, 2012	Fig. 74
<i>Gauromyrmex</i> sp. clm01	Fig. 75
<i>Lordomyrma</i> sp. clm01	Fig. 76
<i>Monomorium pharaonis</i> (Linnaeus, 1758)	Fig. 77
<i>Monomorium</i> sp. clm01	Fig. 78
<i>Myrmica draco</i> Radchenko, Zhou & Elmes, 2001	Fig. 79
<i>Myrmica pleiorhytida</i> Radchenko & Elmes, 2009	Fig. 80
<i>Myrmica</i> sp. clm01	Fig. 81
<i>Myrmecina</i> sp. clm01	Fig. 82
<i>Myrmecina</i> sp. clm02	Fig. 83
<i>Myrmecina</i> sp. clm03	Fig. 84
<i>Pheidole allani</i> Bingham, 1903	Figs 85, 86
<i>Pheidole fervens</i> Smith, 1858	Fig. 87
<i>Pheidole fervida</i> Smith, 1874	Fig. 88, 89
<i>Pheidole gatesi</i> (Wheeler, 1927)	Fig. 90
<i>Pheidole indica</i> Mayr, 1879	Fig. 91
<i>Pheidole magna</i> Eguchi, 2006	Figs 92, 93
* <i>Pheidole nodifera</i> (Smith 1858)	Fig. 94
<i>Pheidole zoceana</i> Santschi, 1925	Figs 95, 96
<i>Pristomyrmex brevispinosus</i> Emery, 1887	Fig. 97
<i>Pristomyrmex hamatus</i> Xu & Zhang, 2002	Fig. 98
<i>Stenamma wumengense</i> Liu & Xu, 2011	Fig. 99
<i>Strumigenys assamensis</i> De Andrade, 1994	Fig. 100
<i>Strumigenys strygax</i> Bolton, 2000	Fig. 101
** <i>Strumigenys taphra</i> (Bolton, 2000)	Fig. 102
<i>Strumigenys</i> sp. clm01	Fig. 103
<i>Strumigenys</i> sp. clm02	Fig. 104
<i>Strumigenys</i> sp. clm03	Fig. 105

Species	Figure
* <i>Temnothorax striatus</i> Zhou, Huang, Yu & Liu, 2010	Fig. 106
<i>Temnothorax</i> sp. clm01	Fig. 107
<i>Temnothorax</i> sp. clm03	Fig. 108
<i>Tetramorium tonganum</i> Mayr, 1870	Fig. 109
<i>Tetramorium</i> sp. clm01	Fig. 110
<i>Tetramorium</i> sp. clm02	Fig. 111
<i>Tetramorium</i> sp. clm03	Fig. 112
<i>Tetramorium</i> sp. clm04	Fig. 113
<i>Vollenhovia pyrrhoria</i> Wu & Xiao, 1989	Fig. 114
<i>Vollenhovia</i> sp. clm03	Fig. 115
Ponerinae	
<i>Brachyponera luteipes</i> (Mayr, 1862)	Fig. 116
<i>Ectomomyrmex lobocarenius</i> (Xu, 1995)	Fig. 117
** <i>Ectomomyrmex obtusus</i> Emery, 1900	Fig. 118
<i>Hypoponera</i> sp. clm01	Fig. 119
<i>Hypoponera</i> sp. clm02	Fig. 120
<i>Hypoponera</i> sp. clm03	Fig. 121
<i>Leptogenys birmana</i> Forel, 1900	Fig. 122
<i>Leptogenys kitteli</i> (Mayr, 1870)	Fig. 123
<i>Odontomachus circulus</i> Wang, 1993	Fig. 124
* <i>Odontomachus fulgidus</i> Wang, 1993	Fig. 125
<i>Platythyrea parallela</i> (Smith, 1859)	Fig. 126
<i>Ponera bawana</i> Xu, 2001	Fig. 127
<i>Ponera xantha</i> Xu, 2001	Fig. 128
Proceratinae	
<i>Discothyrea banna</i> Xu, Burwell & Nakamura, 2014	Fig. 129
<i>Discothyrea diana</i> Xu, Burwell & Nakamura, 2014	Fig. 130
<i>Proceratium longigaster</i> Karavaiev, 1935	Fig. 131
<i>Proceratium longmenense</i> Xu, 2006	Fig. 132
<i>Proceratium zhaoi</i> Xu, 2000	Fig. 133
Pseudomyrmecinae	
<i>Tetraponera allaborans</i> (Walker, 1859)	Fig. 134
<i>Tetraponera attenuata</i> Smith, 1877	Fig. 135
<i>Tetraponera protensa</i> Xu & Chai, 2004	Fig. 136

Table 2. Number of ant species of per genus collected in this survey as well the total number of each species per genus in Yunnan province.

Genus	Gaoligongshan Mt.	Yunnan	Genus	Gaoligongshan Mt.	Yunnan
<i>Camponotus</i>	10	30	<i>Leptogenys</i>	2	17
<i>Pheidole</i>	8	42	<i>Monomorium</i>	2	6
<i>Polyrhachis</i>	8	32	<i>Odontomachus</i>	2	6
<i>Aphaenogaster</i>	6	10	<i>Ponera</i>	2	14
<i>Strumigenys</i>	6	24	<i>Pristomyrmex</i>	2	4
<i>Tetramorium</i>	5	29	<i>Pseudolasius</i>	2	6
<i>Aenictus</i>	5	19	<i>Vollenhovia</i>	2	3
<i>Carebara</i>	5	19	<i>Anoplolepis</i>	1	1
<i>Prenolepis</i>	4	7	<i>Brachyponera</i>	1	3
<i>Crematogaster</i>	3	25	<i>Cataulacus</i>	1	4
<i>Dolichoderus</i>	3	9	<i>Chrysapace</i>	1	1
<i>Hypoponera</i>	3	7	<i>Dilobocondyla</i>	1	3
<i>Lasius</i>	2	6	<i>Dorylus</i>	1	3
<i>Myrmica</i>	3	12	<i>Gaoligongidris</i>	1	1

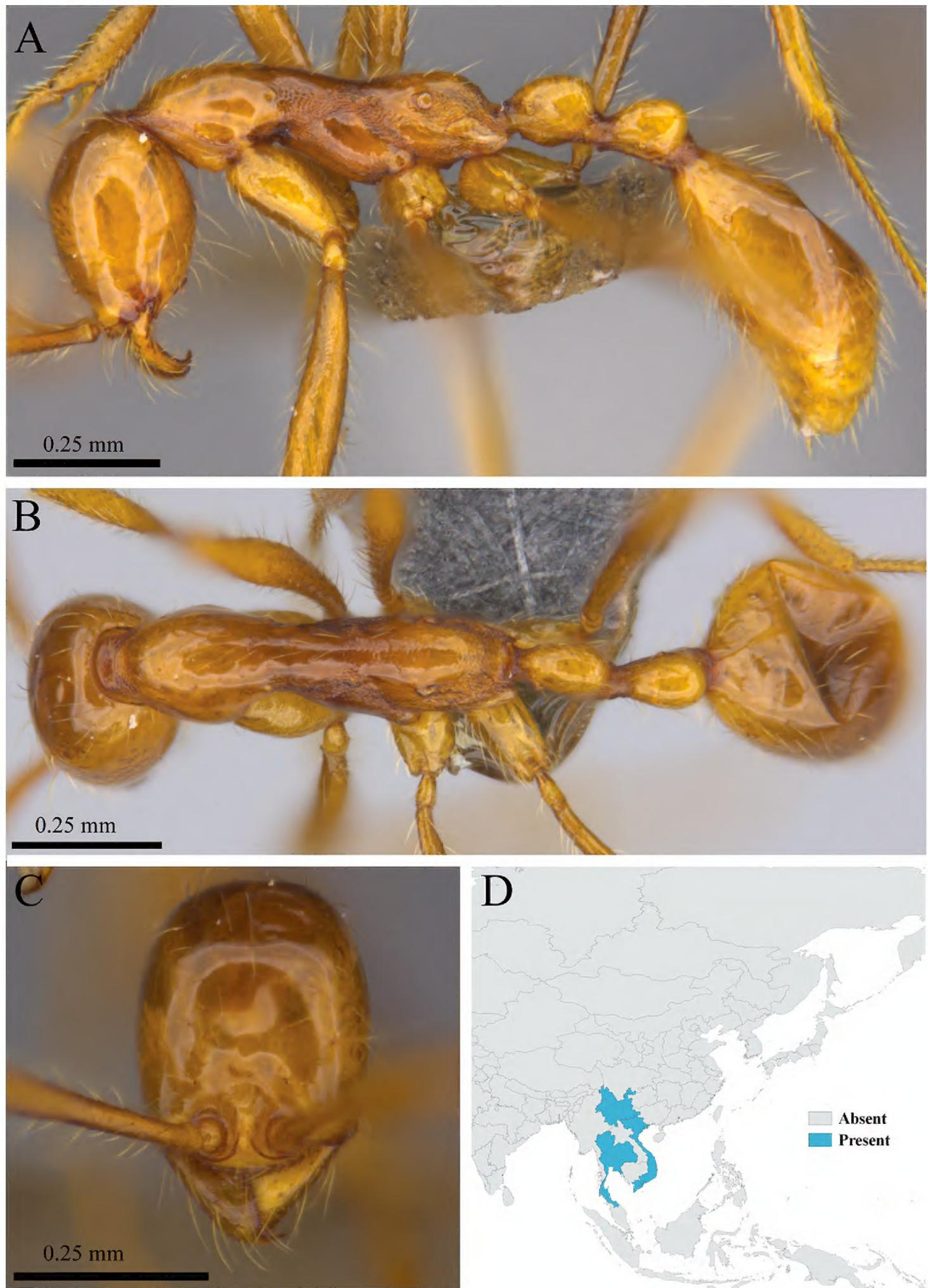
Genus	Gaoligongshan Mt.	Yunnan	Genus	Gaoligongshan Mt.	Yunnan
<i>Myrmecina</i>	3	7	<i>Gauromyrmex</i>	1	1
<i>Nylanderia</i>	3	10	<i>Gnamptogenys</i>	1	7
<i>Paraparatrechina</i>	3	2	<i>Lordomyrma</i>	1	1
<i>Proceratium</i>	3	4	<i>Ochetellus</i>	1	1
<i>Temnothorax</i>	3	7	<i>Oecophylla</i>	1	1
<i>Tetraponera</i>	3	12	<i>Ooceraea</i>	1	1
<i>Cardiocondyla</i>	2	4	<i>Platythyrea</i>	1	2
<i>Cerapachys</i>	2	1	<i>Stenamma</i>	1	4
<i>Discothyrea</i>	2	3	<i>Stigmatoma</i>	1	11
<i>Ectomomyrmex</i>	2	8	<i>Tapinoma</i>	1	4
<i>Formica</i>	2	7	Total	130	550

Table 3. Ant species records that have been excluded from Yunnan when compared to the previous list. The explanation “Needs verification” usually signifies that the species has never been recorded before in this region and/or is easily mistaken for another species and likely to have been misidentified. “Dubious” means that the record occurrence is highly unlikely given the known species distribution. Notes provide additional references regarding records and/or further information.

Excluded species records	Explanations	Notes
<i>Camponotus aethiops</i>	Needs verification	A Palearctic species with distribution in Asia needs confirmation
<i>Camponotus spenceri</i>	Dubious	An Australian species misreported previously
<i>Cardiocondyla nuda</i>	Dubious	Could be <i>C. kagutsuchi</i> , see Seifert 2003
<i>Discothyrea clavicornis</i>	Dubious	A misidentification of <i>D. diana</i>
<i>Discothyrea kamiteta</i>	Dubious	A misidentification of <i>D. banna</i>
<i>Formica fusca</i>	Needs verification	A Palearctic species with distribution in Asia needs confirmation
<i>Hypoponera exoecata</i>	Needs verification	Species with distribution limited to East Asia
<i>Lasius alienus</i>	Dubious	See Seifert 2020
<i>Lasius emarginatus</i>	Dubious	A West Palearctic species with distribution in Asia doubtful
<i>Lasius fuliginosus</i>	Dubious	See Espadaler et al. 2001
<i>Lasius niger</i>	Dubious	See Seifert 1992
<i>Lasius productus</i>	Needs verification	Species with distribution limited to Japan and the Korean Peninsula
<i>Lasius spathepus</i>	Needs verification	Species with distribution limited to Japan, the Korean Peninsula and Eastern Russia
<i>Leptogenys yerburyi</i>	Dubious	See Xu and He 2015
<i>Myrmica inezae</i>	Needs verification	See Chen et al. 2016.
<i>Odontoponera transversa</i>	Dubious	See Yamane 2009
<i>Proceratium deelemani</i>	Dubious	Record represented a new species subsequently described in Staab et al. 2018.
<i>Proceratium japonicum</i>	Dubious	A misidentification of <i>P. longigaster</i>
<i>Temnothorax melleus</i>	Needs verification	A central Asian species which presence in Yunnan requires confirmation
<i>Tetramorium inglebyi</i>	Dubious	An Indian species that is restricted to the Southwest.
<i>Tetramorium globulinode</i>	Dubious	An Afrotropical species incorrectly reported in Asia
<i>Tetramorium khnum</i>	Dubious	An endemic species in the Philippines
<i>Tetramorium melleum</i>	Dubious	A misidentification of <i>T. wroughtonii</i>
<i>Tetraponera aitkenii</i>	Dubious	Phil Ward (Personal communication, 18 August 2015)
<i>Tetraponera nigra</i>	Dubious	Phil Ward (Personal communication, 18 August 2015)
<i>Vollenhovia emeryi</i>	Dubious	See Wetterer et al. 2015

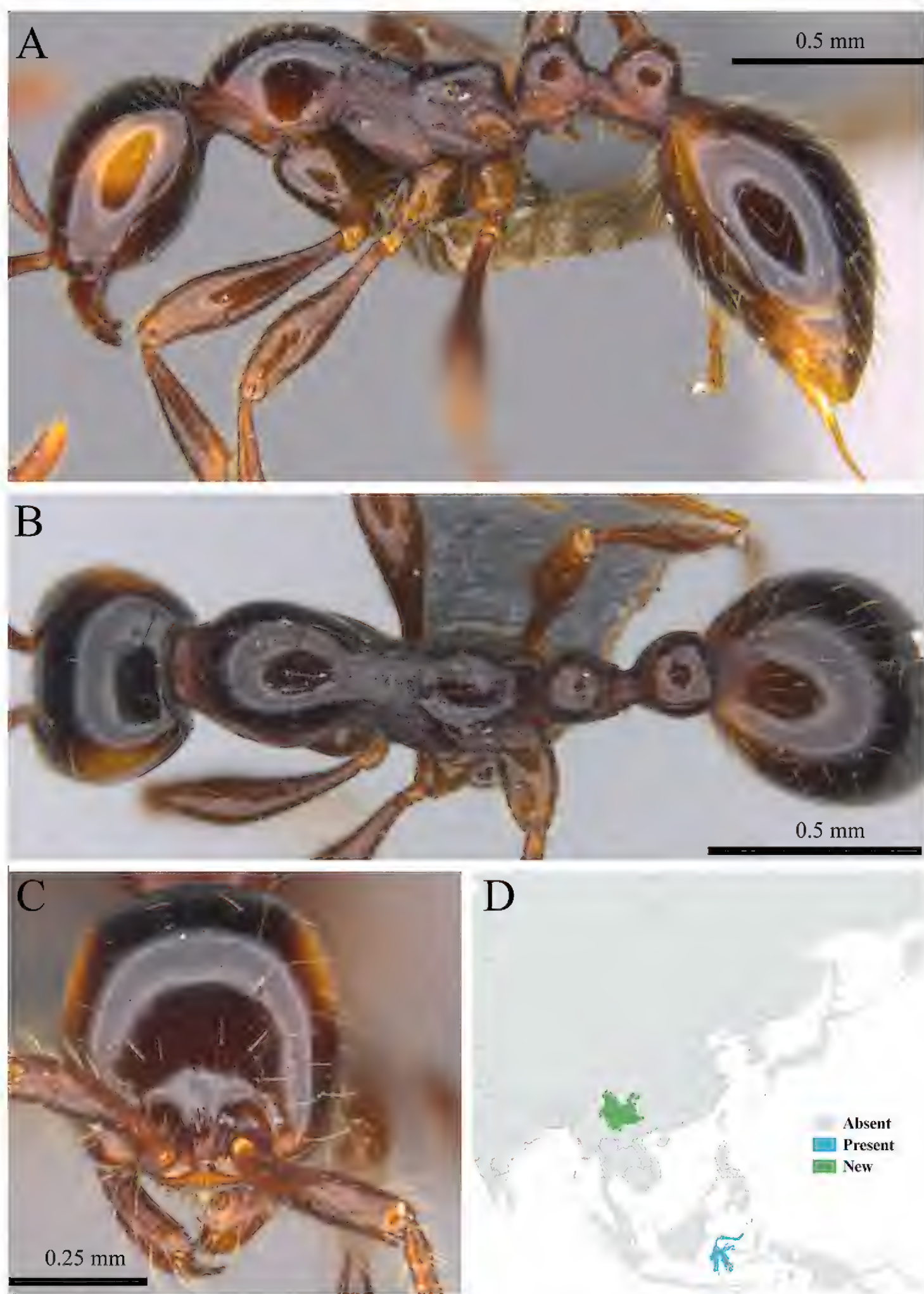
Table 4. Number of ant species (both native and exotic species) in Yunnan Province. * Ant genus only known from morphospecies records.

Genus	Native	Exotic	Genus	Native	Exotic
<i>Pheidole</i>	42	0	<i>Solenopsis</i>	2	1
<i>Polyrhachis</i>	32	0	<i>Acanthomyrmex</i>	2	0
<i>Camponotus</i>	30	0	<i>Acropyga</i>	2	0
<i>Tetramorium</i>	28	1	<i>Echinopla</i>	2	0
<i>Crematogaster</i>	25	0	<i>Meranoplus</i>	2	0
<i>Strumigenys</i>	24	1	<i>Myrmoteras</i>	2	0
<i>Aenictus</i>	19	0	<i>Paraparatrechina</i>	2	0
<i>Carebara</i>	19	0	<i>Perissomyrmex</i>	2	0
<i>Leptogenys</i>	17	0	<i>Platythyrea</i>	2	0
<i>Ponera</i>	14	0	<i>Pseudoneoponera</i>	2	0
<i>Tetraponera</i>	12	0	<i>Rhopalomastix</i>	2	0
<i>Myrmica</i>	12	0	<i>Trichomyrmex</i>	0	2
<i>Stigmatomma</i>	11	0	<i>Vollenhovia</i>	2	0
<i>Technomyrmex</i>	11	0	<i>Anoplolepis</i>	1	0
<i>Aphaenogaster</i>	10	0	<i>Buniapone</i>	1	0
<i>Nylanderia</i>	9	1	<i>Centromyrmex</i>	1	0
<i>Dolichoderus</i>	9	0	<i>Cerapachys</i>	1	0
<i>Ectomomyrmex</i>	8	0	<i>Chrysapace</i>	1	0
<i>Lepisiota</i>	8	0	<i>Diacamma</i>	1	0
<i>Colobopsis</i>	7	0	<i>Emeryopone</i>	1	0
<i>Hypoponera</i>	5	2	<i>Erromyrmex</i>	1	0
<i>Prenolepis</i>	7	0	<i>Euponera</i>	1	0
<i>Temnothorax</i>	7	0	<i>Gaoligongidris</i>	1	0
<i>Formica</i>	7	0	<i>Gauromyrmex</i>	1	0
<i>Gnamptogenys</i>	7	0	<i>Gesomyrmex</i>	1	0
<i>Myrmecina</i>	7	0	<i>Harpegnathos</i>	1	0
<i>Anochetus</i>	6	0	<i>Iridomyrmex</i>	1	0
<i>Lasius</i>	6	0	<i>Lasiomyrma</i> *	1	0
<i>Odontomachus</i>	6	0	<i>Liometopum</i>	1	0
<i>Pseudolasius</i>	6	0	<i>Lioponera</i>	1	0
<i>Cryptopone</i>	5	0	<i>Lordomyrma</i> *	1	0
<i>Monomorium</i>	5	0	<i>Mesoponera</i>	1	0
<i>Proceratium</i>	4	0	<i>Messor</i>	1	0
<i>Cataulacus</i>	4	0	<i>Myrmicaria</i>	1	0
<i>Plagiolepis</i>	3	1	<i>Mystrium</i>	1	0
<i>Pristomyrmex</i>	4	0	<i>Ochetellus</i>	1	0
<i>Protanilla</i>	4	0	<i>Odontoponera</i>	1	0
<i>Stenamma</i>	4	0	<i>Oecophylla</i>	1	0
<i>Tapinoma</i>	4	0	<i>Ooceraea</i>	1	0
<i>Brachyponera</i>	3	0	<i>Parasyscia</i>	1	0
<i>Cardiocondyla</i>	2	1	<i>Paratrechina</i>	0	1
<i>Chronoxenus</i>	3	0	<i>Philidris</i>	1	0
<i>Dilobocondyla</i>	3	0	<i>Prionopelta</i> *	1	0
<i>Discothyrea</i>	3	0	<i>Probolomyrmex</i>	1	0
<i>Dorylus</i>	3	0	<i>Rotastruma</i>	1	0
<i>Kartidris</i>	3	0	<i>Simopone</i>	1	0
<i>Leptanilla</i>	3	0	<i>Syscia</i>	1	0
<i>Lophomyrmex</i>	3	0	<i>Vombisidris</i>	1	0
<i>Myopias</i>	3	0	<i>Yunodorylus</i>	1	0
<i>Recurvidris</i>	3	0			



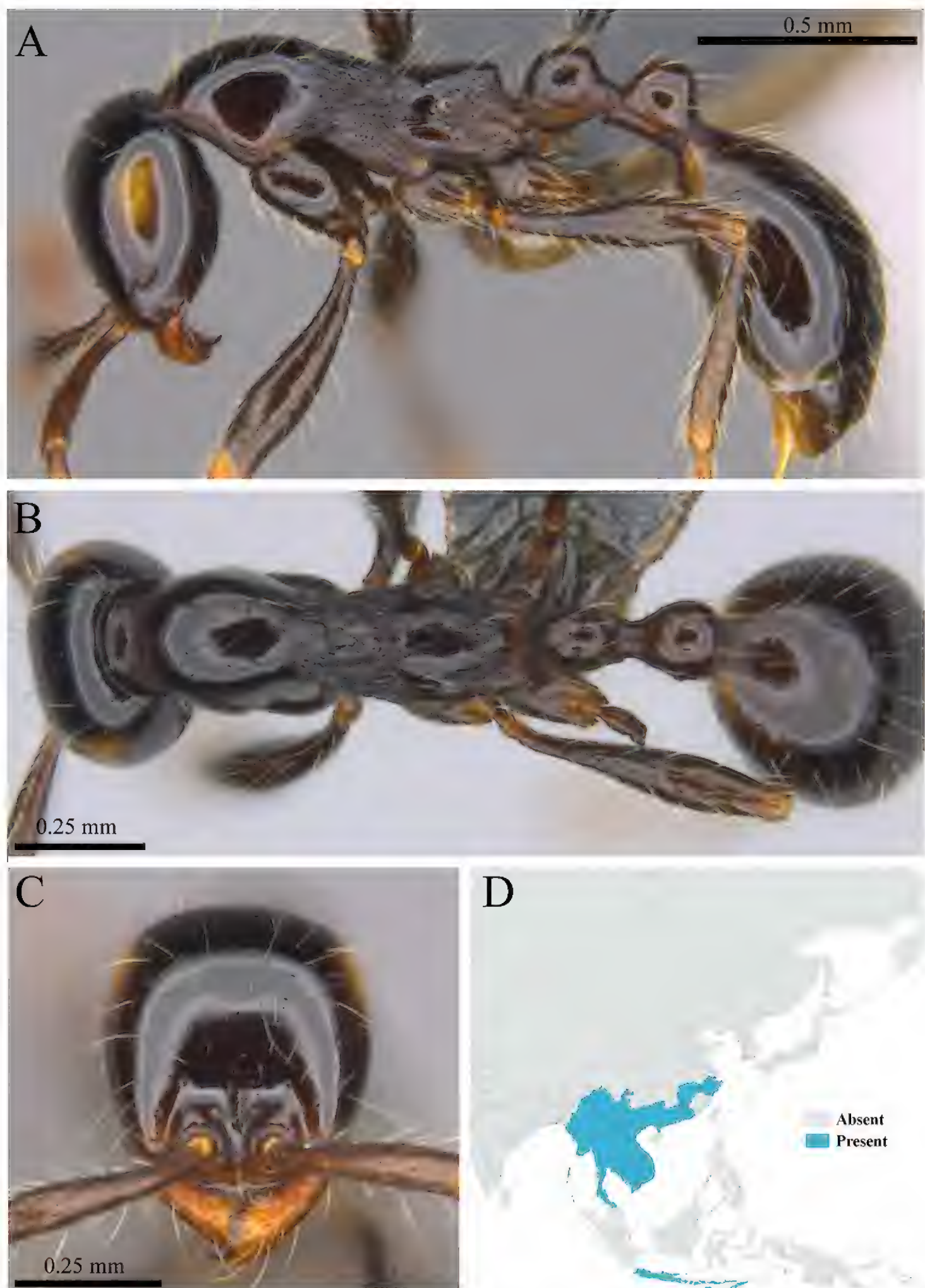
Aenictus artipus

Figure 1. *Aenictus artipus* worker (MCZ-ENT00763651) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



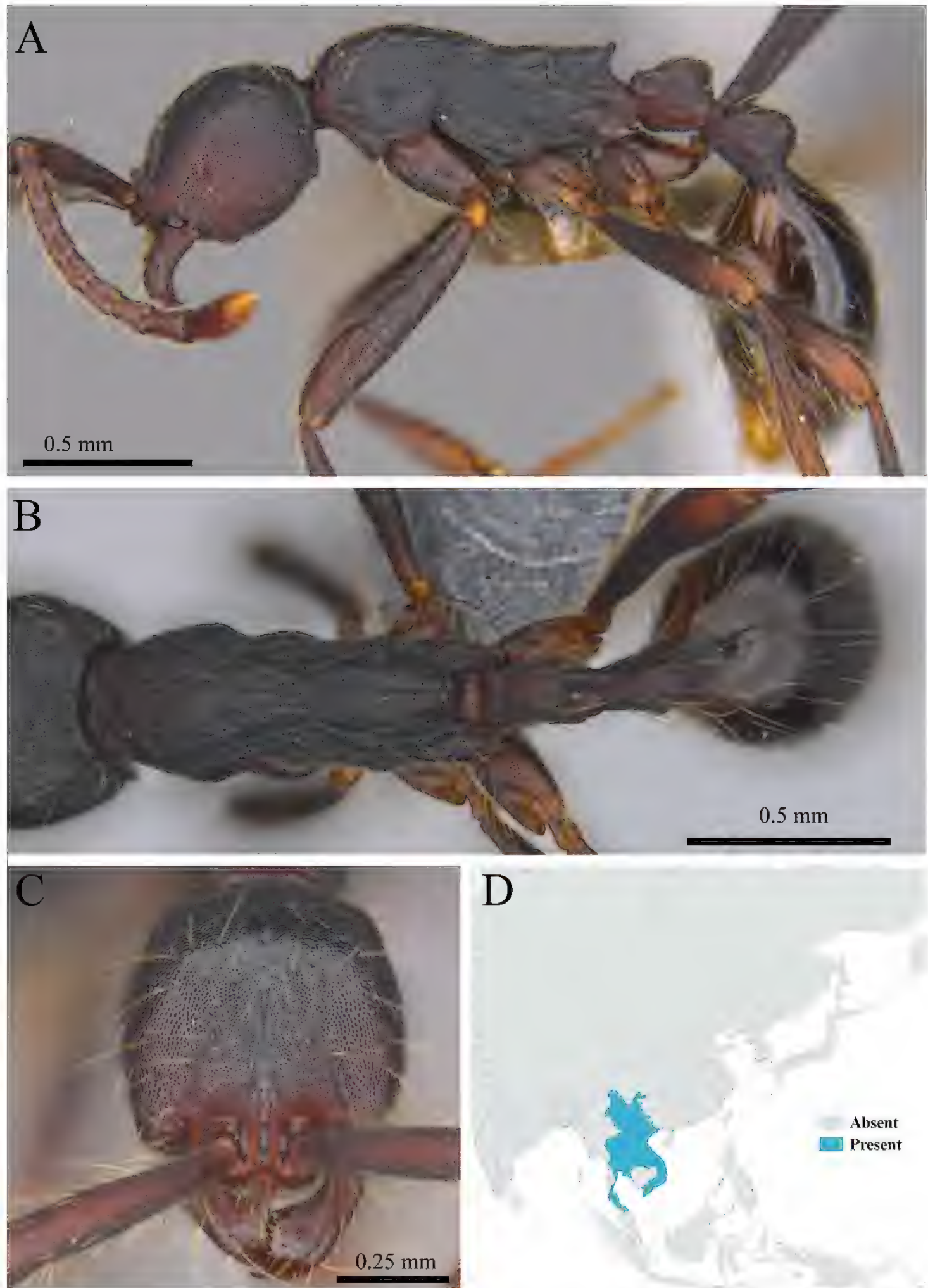
Aenictus brevinodus

Figure 2. *Aenictus brevinodus* worker (MCZ-ENT00763491, new to China) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



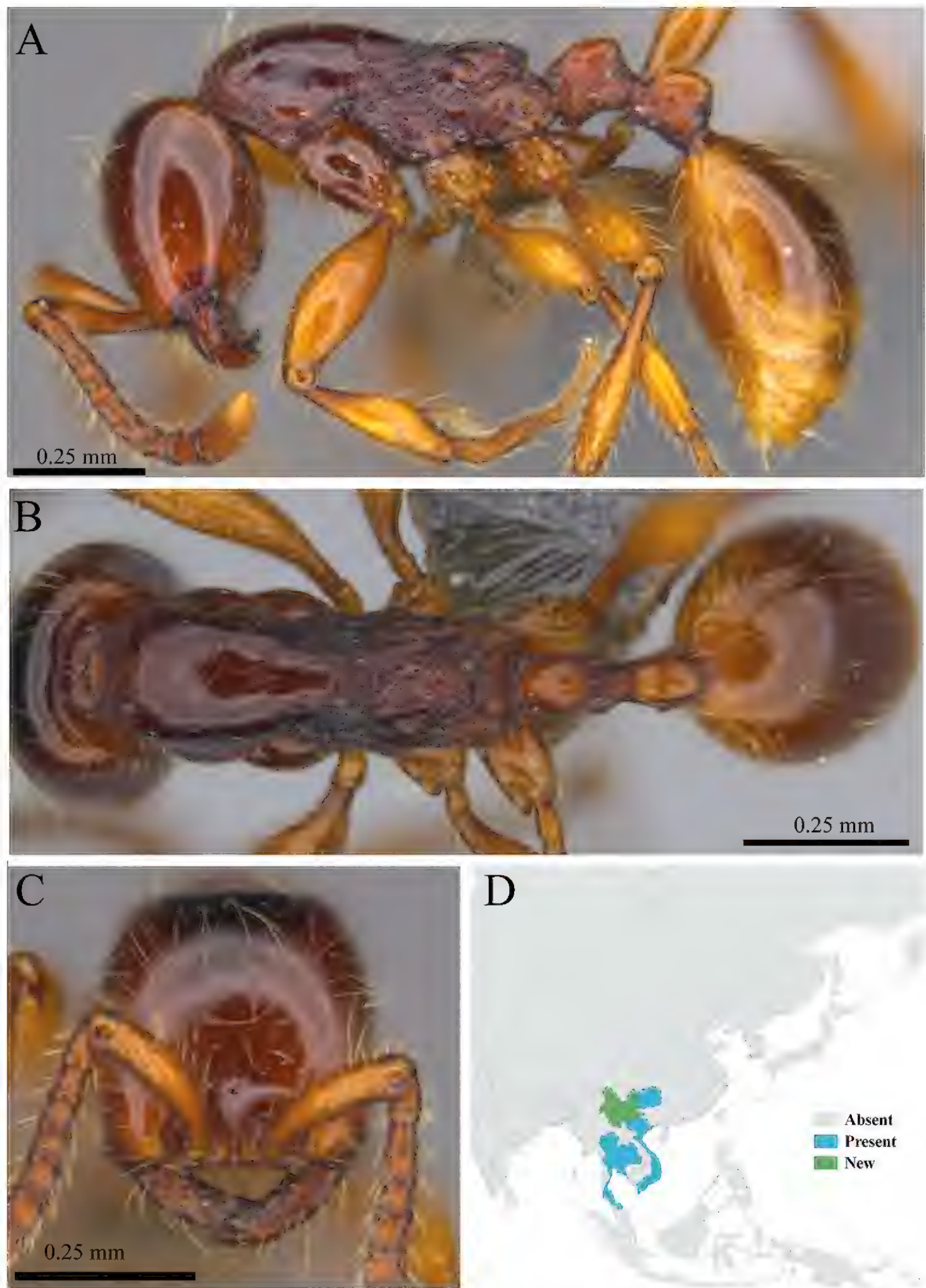
Aenictus hodgsoni

Figure 3. *Aenictus hodgsoni* worker (MCZ-ENT00763191) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



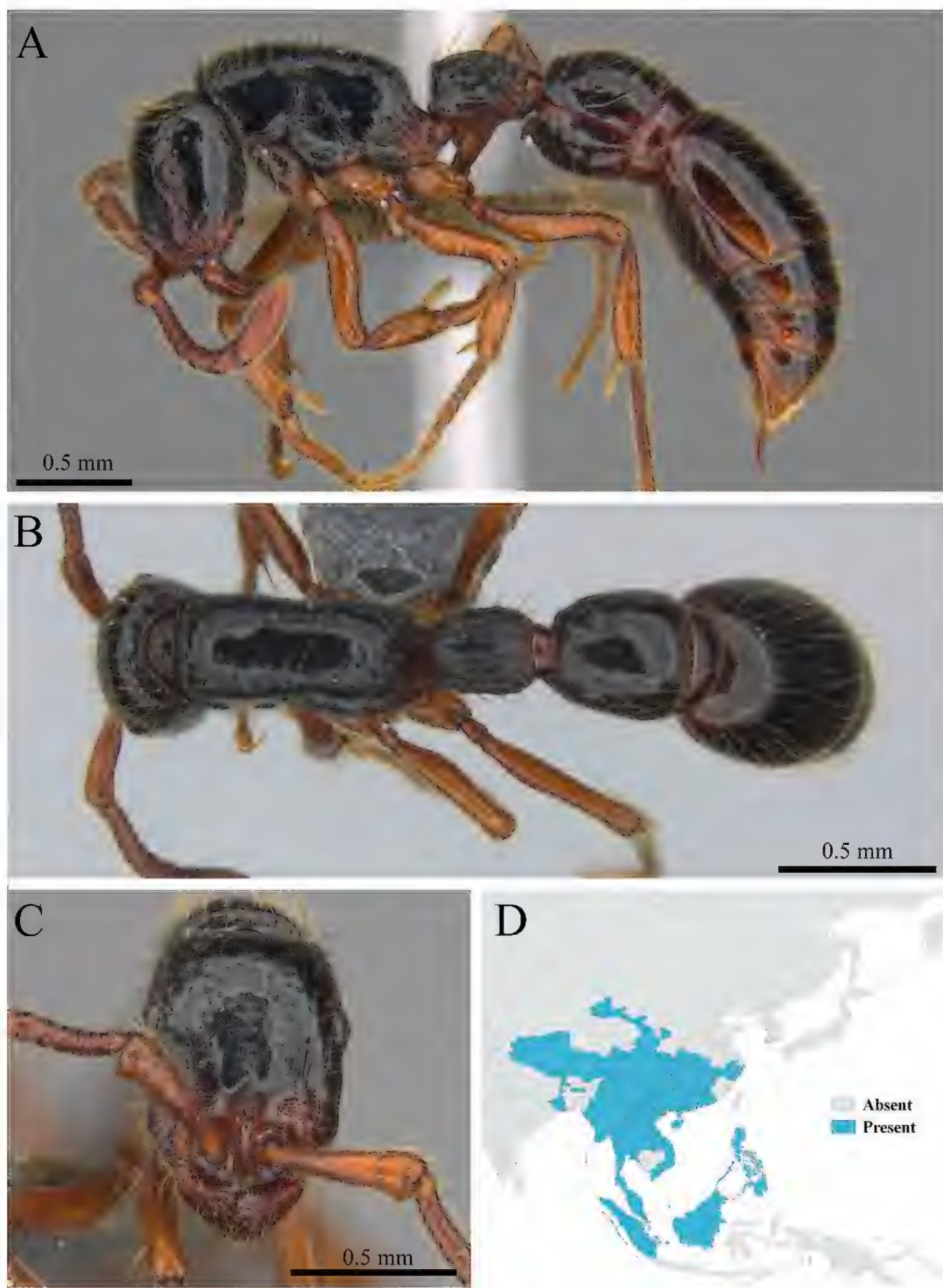
Aenictus paracentatus

Figure 4. *Aenictus paracentatus* worker (MCZ-ENT00763384) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



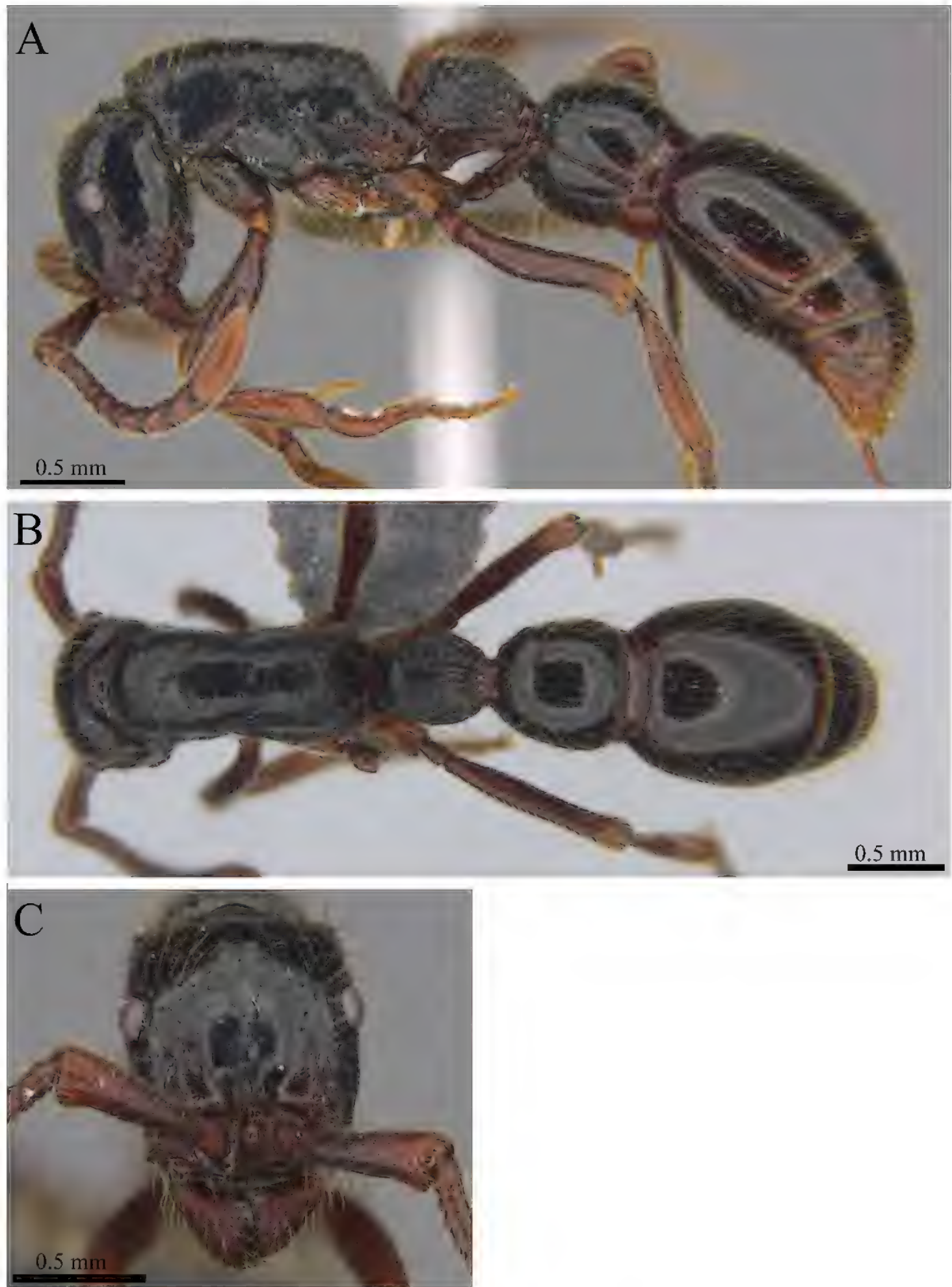
Aenictus watanasiti

Figure 5. *Aenictus watanasiti* worker (MCZ-ENT00764608, new to Yunnan) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



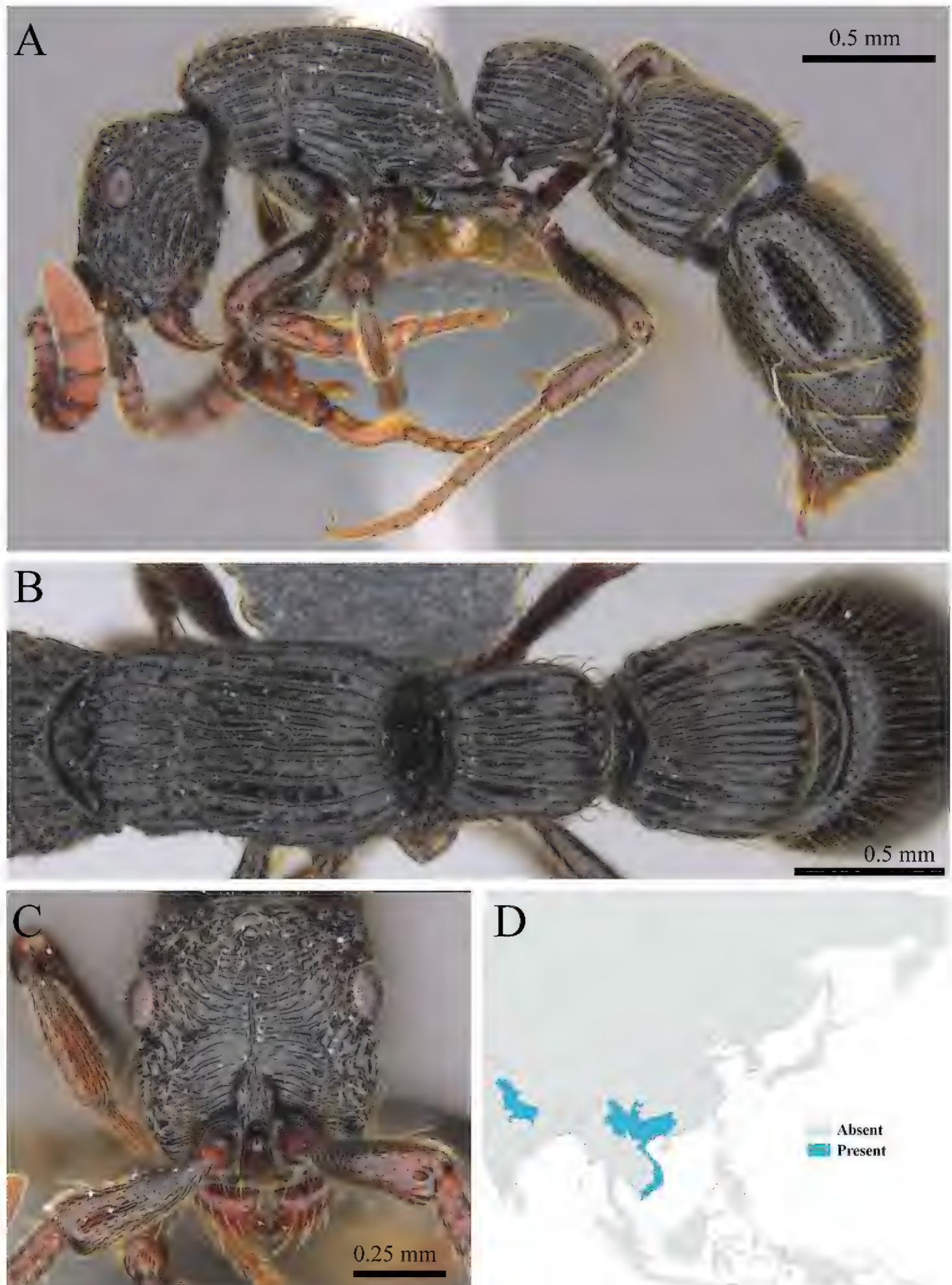
Cerapachys sulcinodus

Figure 6. *Cerapachys sulcinodus* worker (MCZ-ENT00759751) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



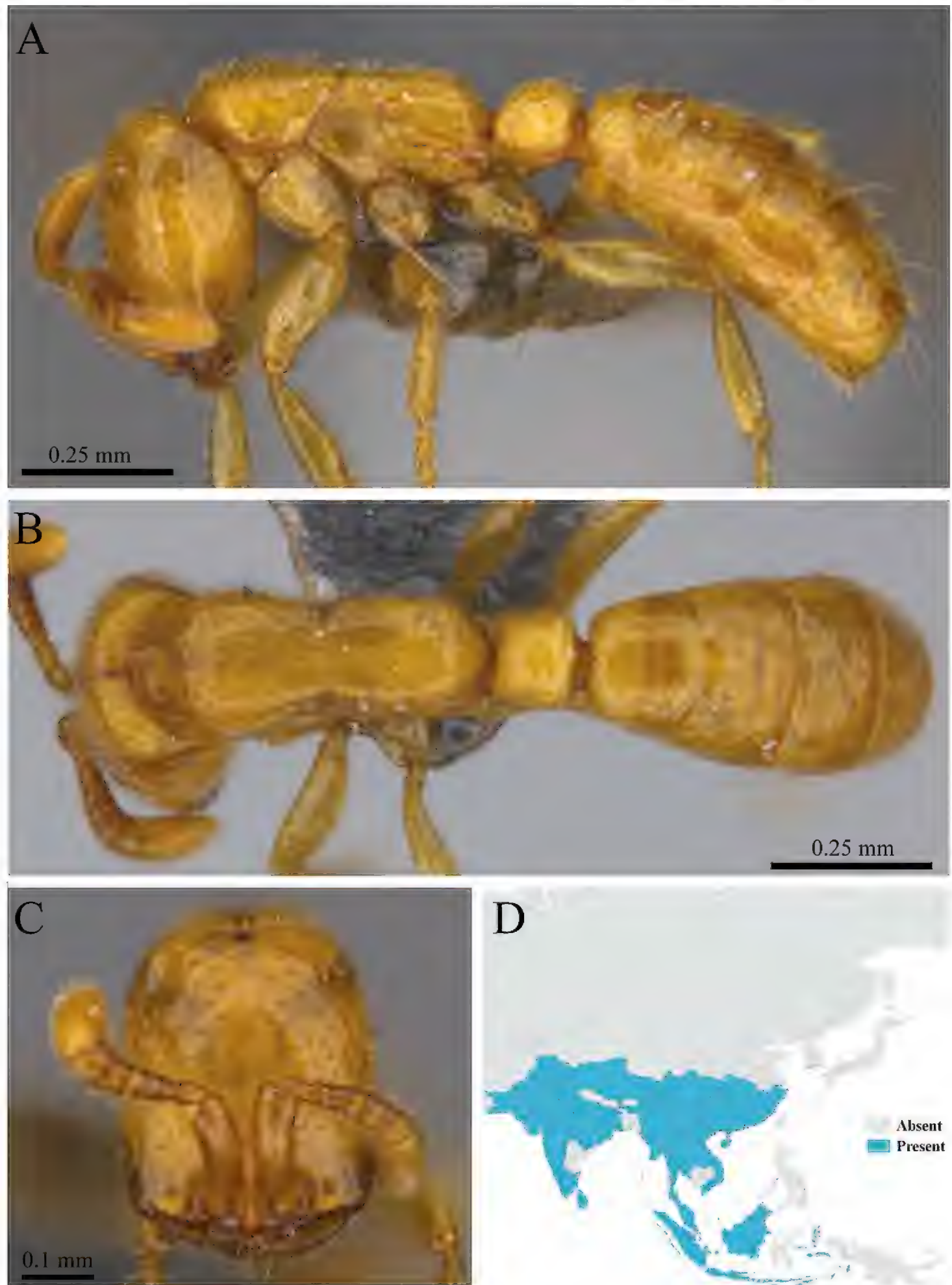
Cerapachys sp1

Figure 7. *Cerapachys* sp. clm01worker (MCZ-ENT00763371) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



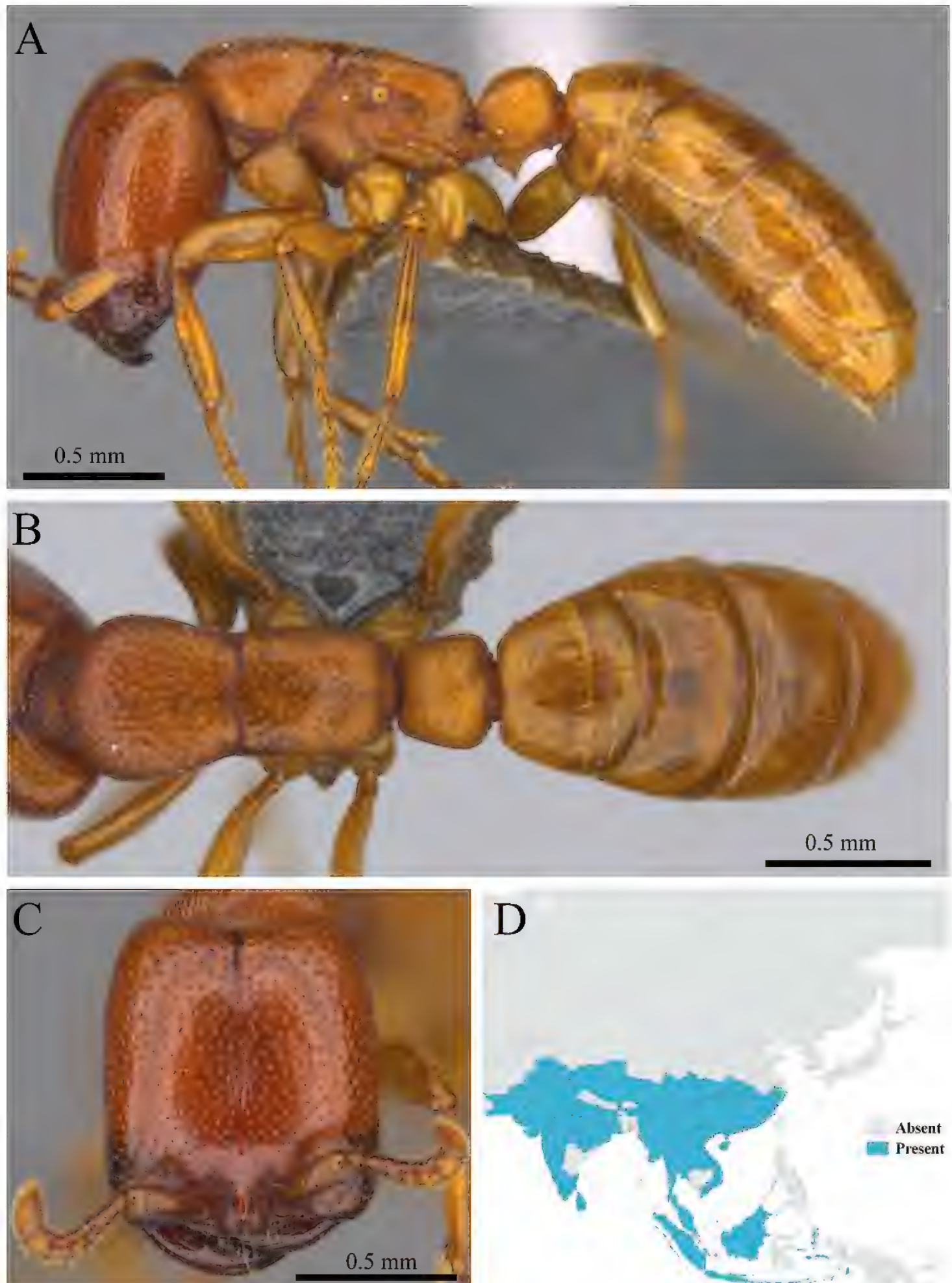
Chrysapace costatus

Figure 8. *Chrysapace costatus* worker (MCZ-ENT00763341) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



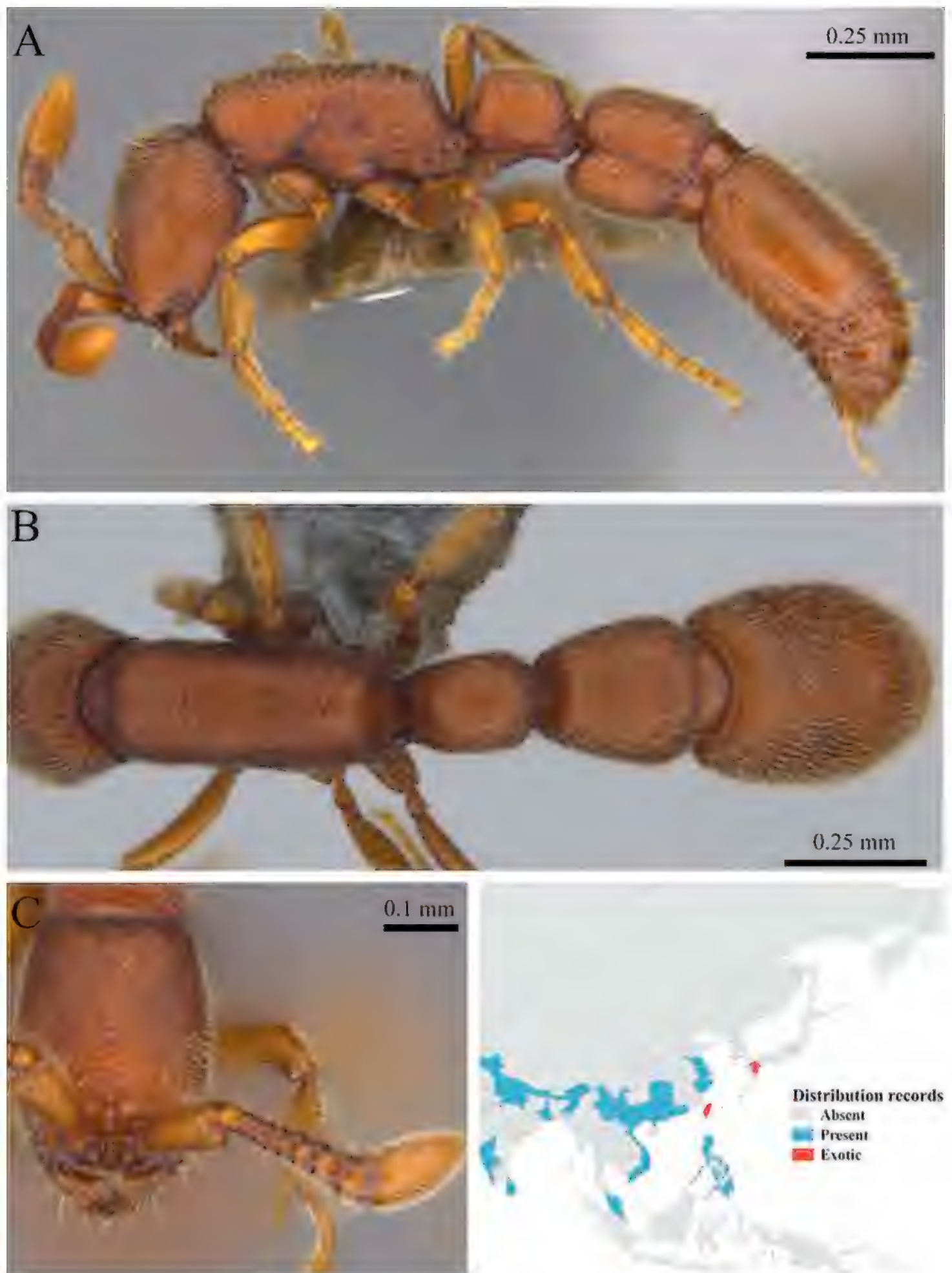
Dorylus orientalis

Figure 9. *Dorylus orientalis* minor worker (MCZ-ENT00760027) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



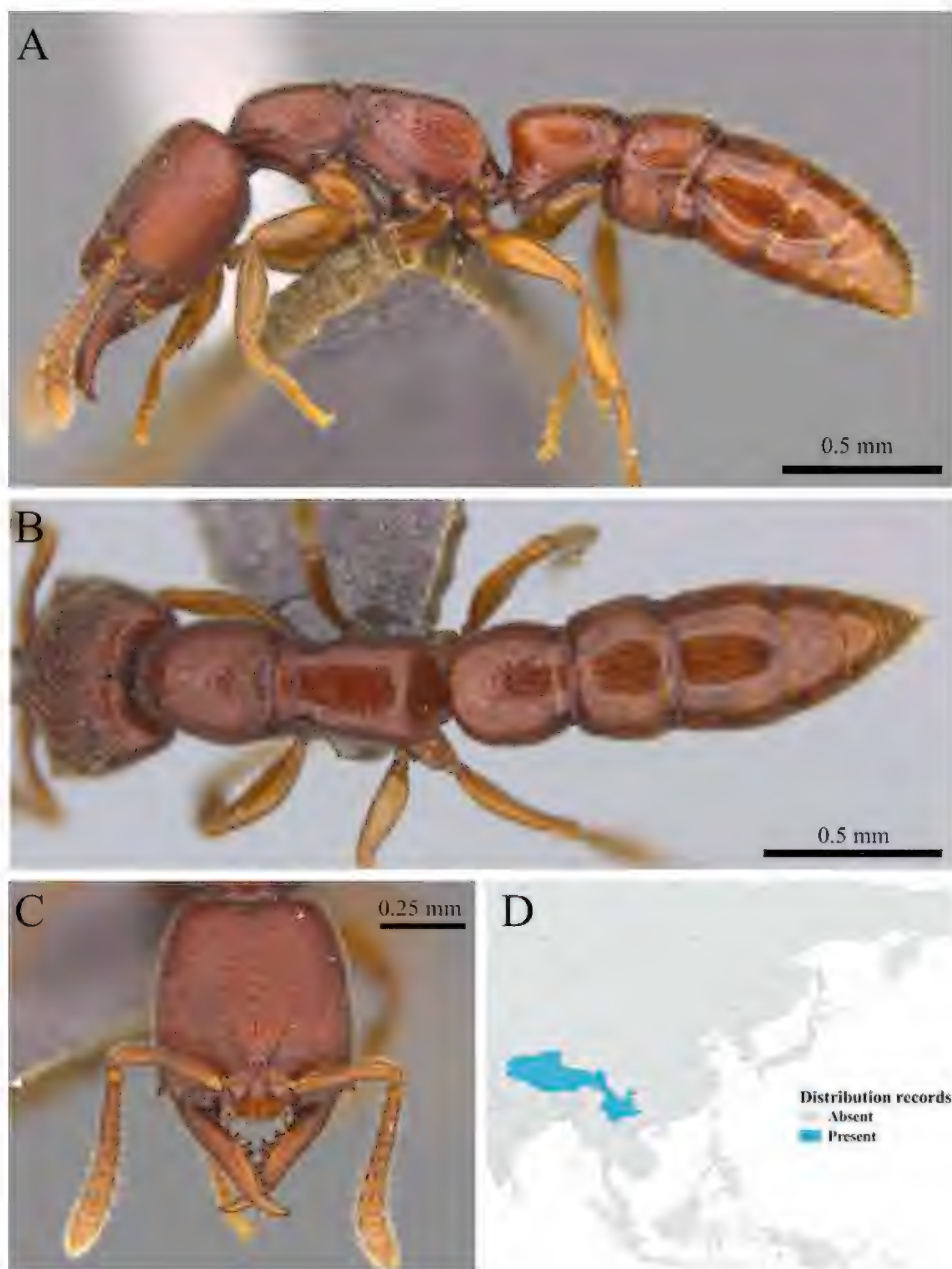
Dorylus orientalis (soldier)

Figure 10. *Dorylus orientalis* major worker (MCZ-ENT00760028) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



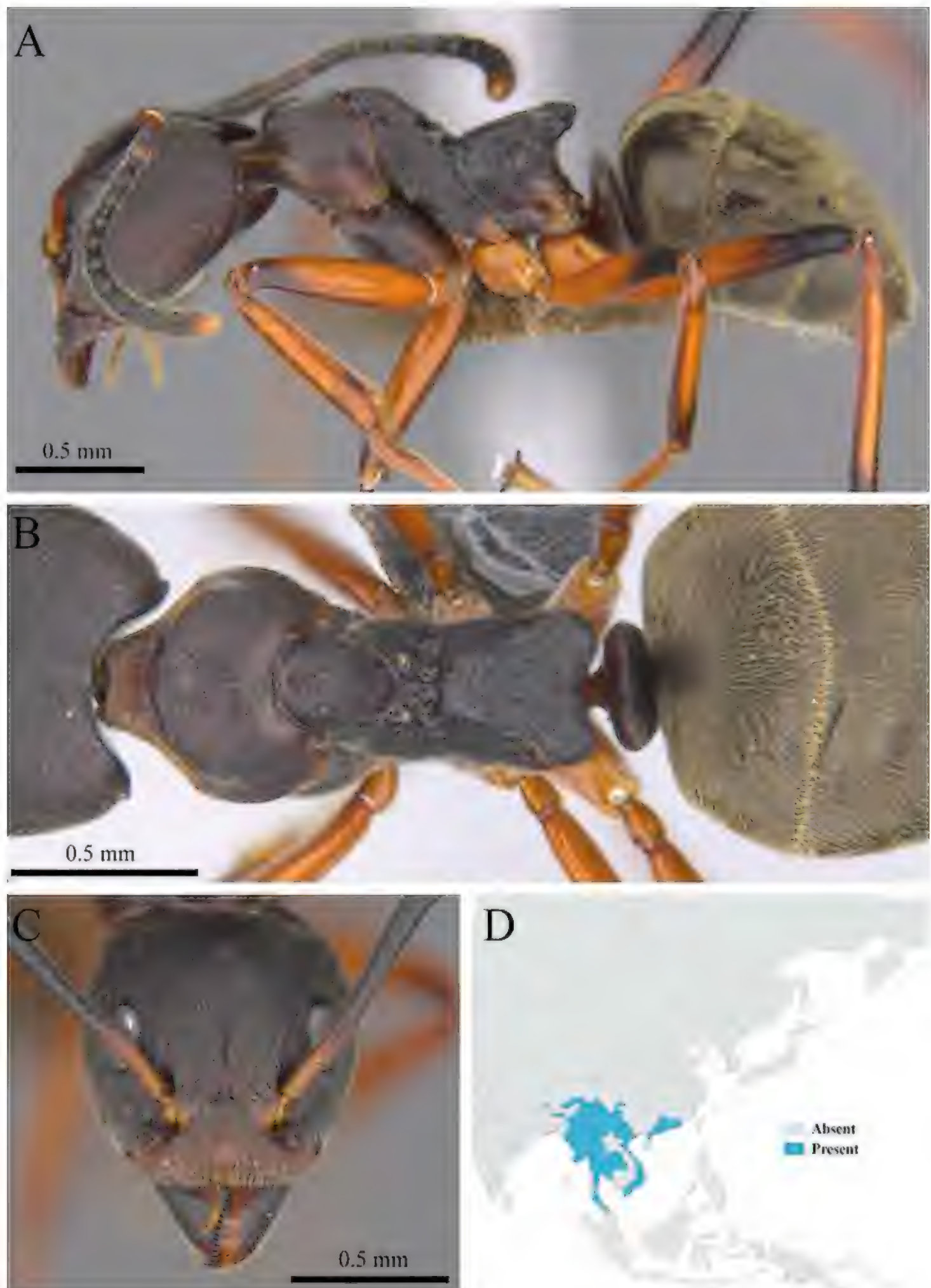
Ooceraea biroi

Figure 11. *Ooceraea biroi* worker (MCZ-ENT00759984) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



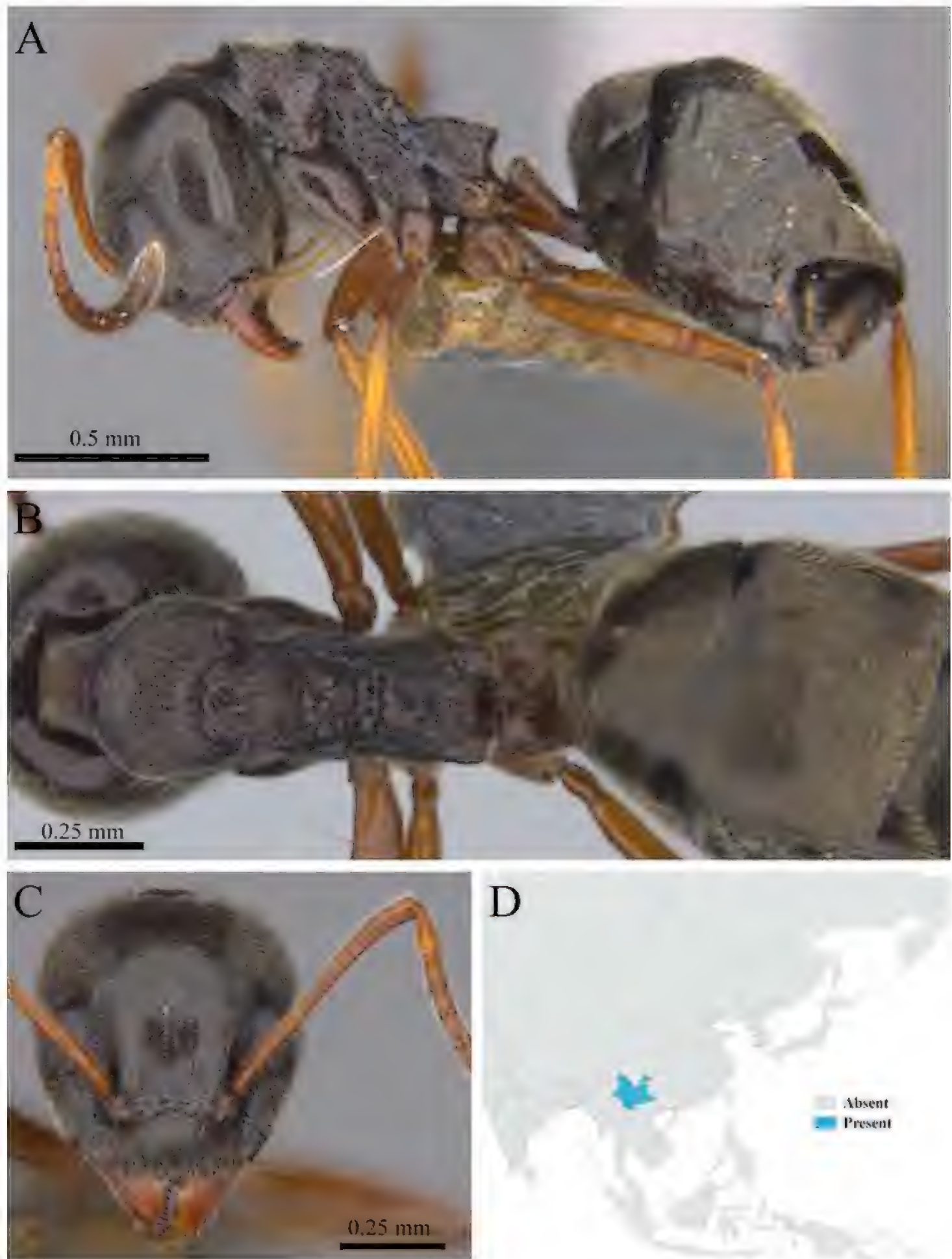
Stigmatomma octoderthatum

Figure 12. *Stigmatomma octoderthatum* worker (MCZ-ENT00759880) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



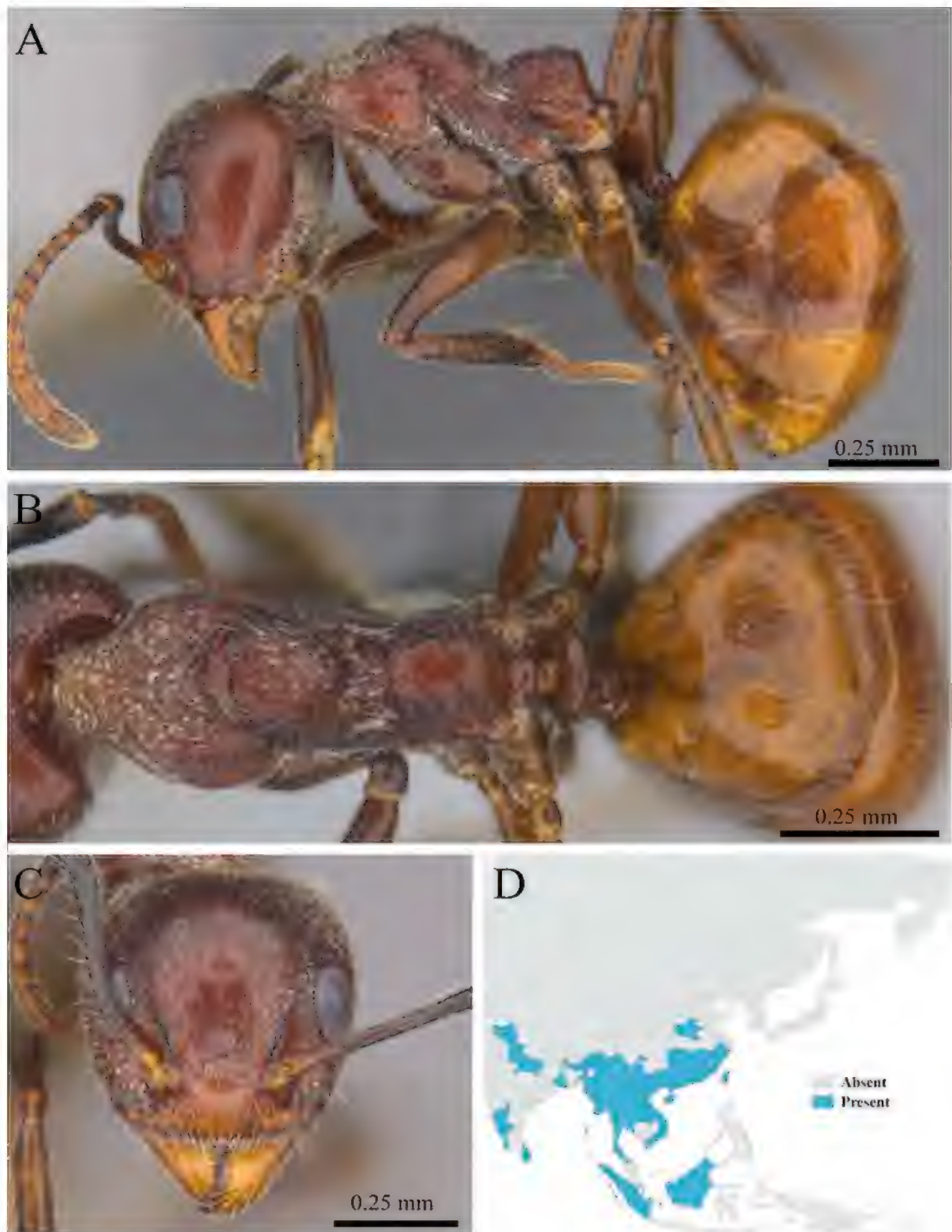
Dolichoderus feae

Figure 13. *Dolichoderus feae* worker (MCZ-ENT00763272) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



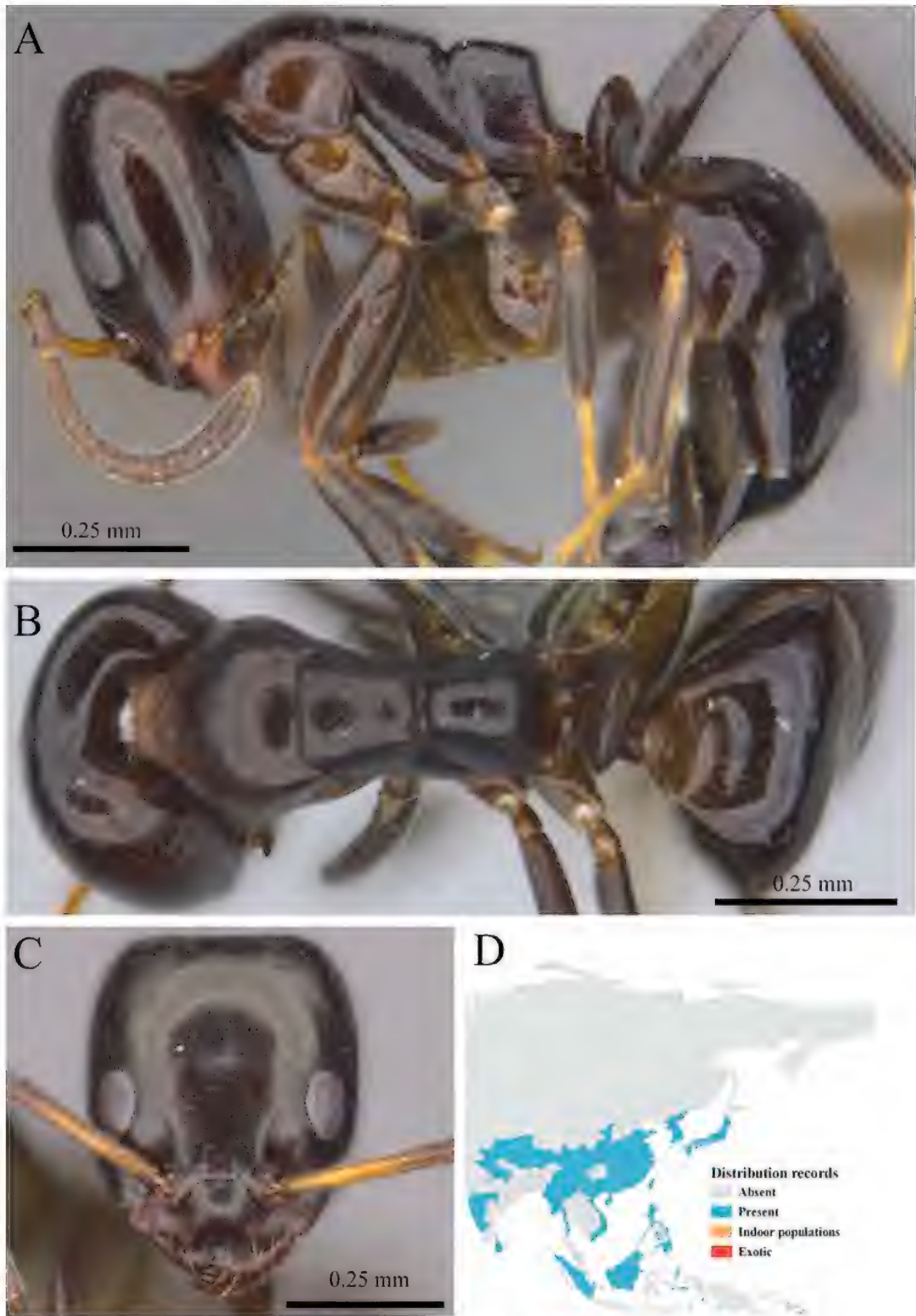
Dolichoderus squamanodus

Figure 14. *Dolichoderus squamanodus* worker (MCZ-ENT00762839) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



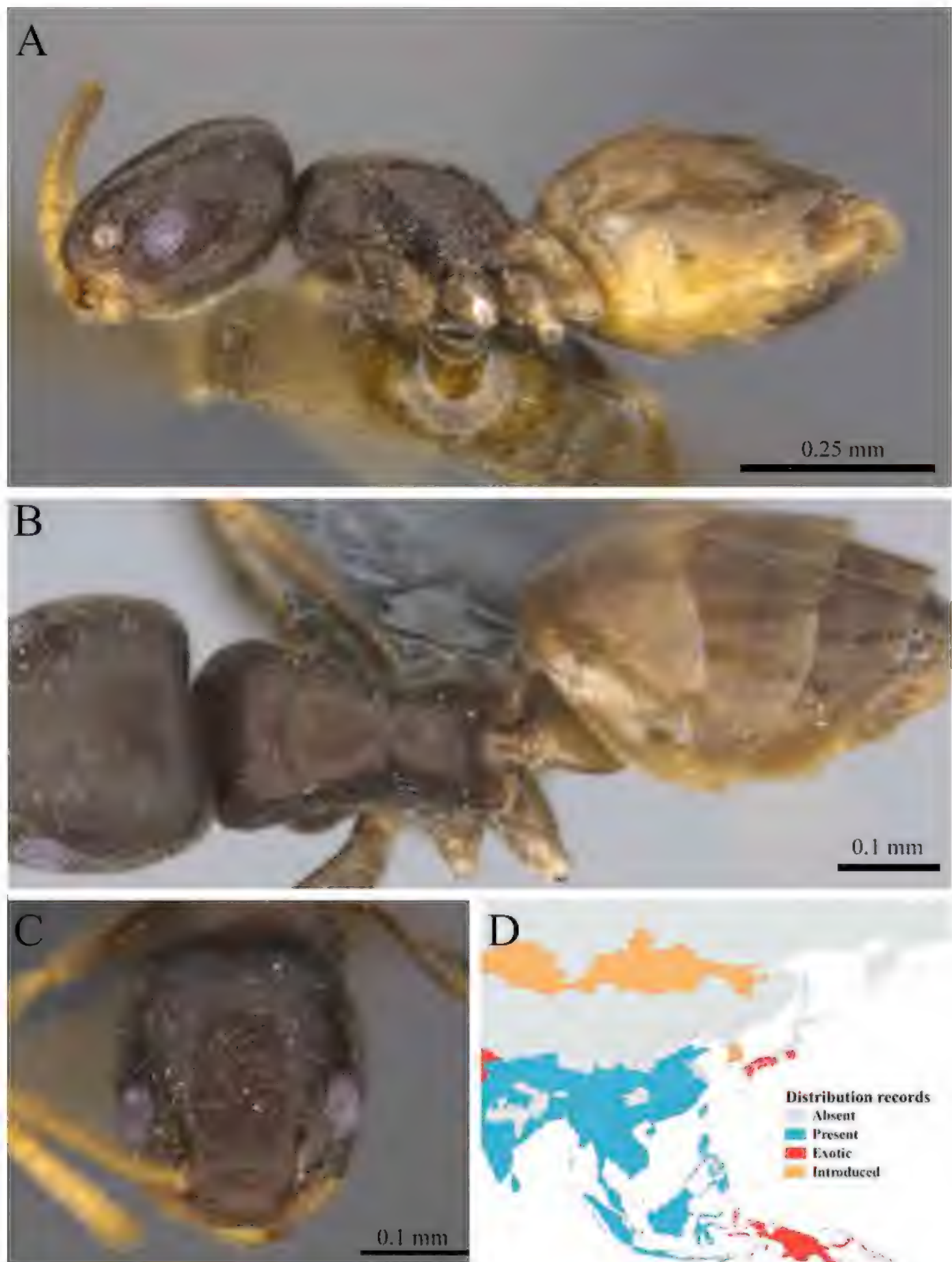
Dolichoderus taprobanae

Figure 15. *Dolichoderus taprobanae* worker (MCZ-ENT00763246) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



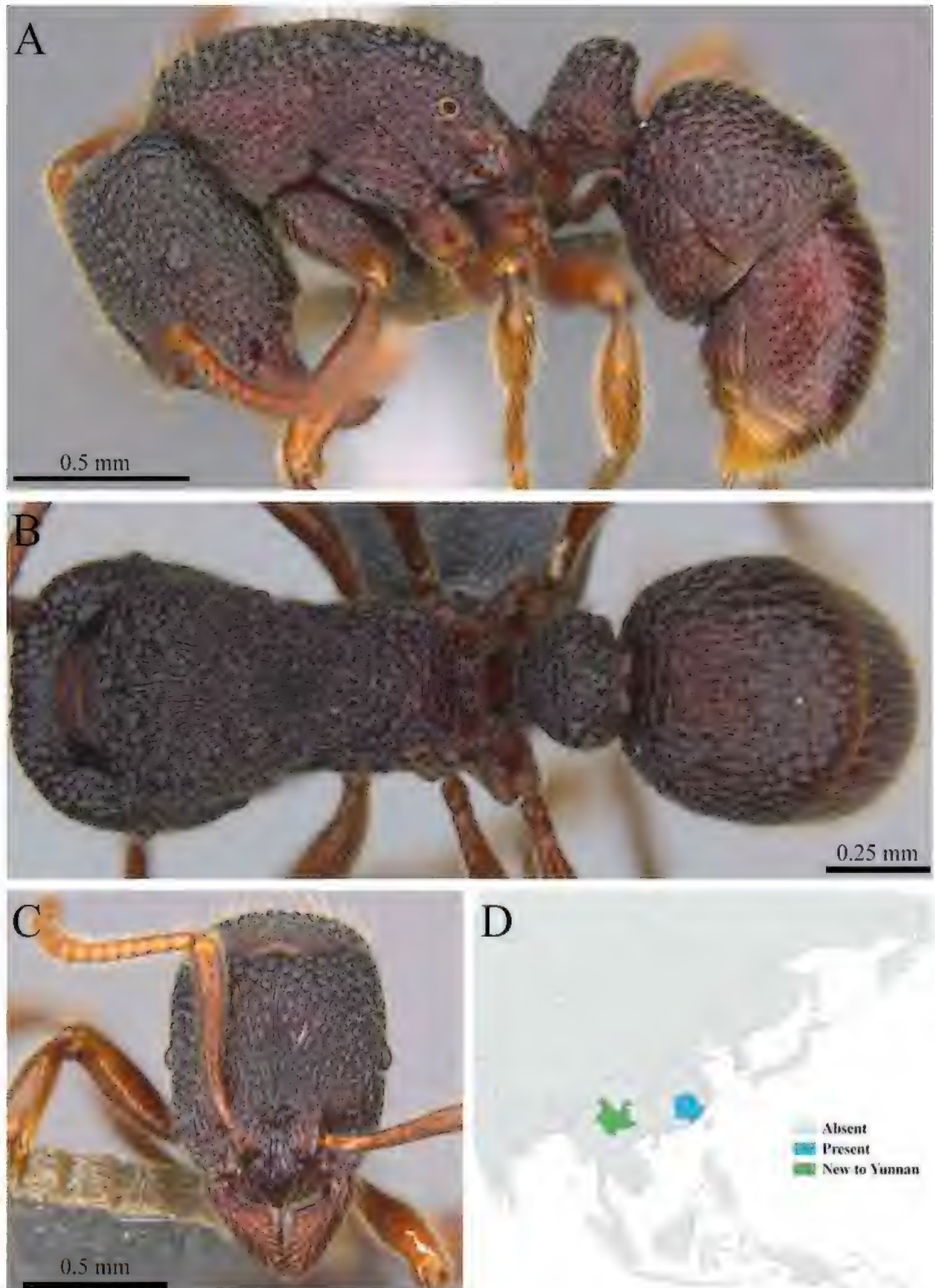
Ochetellus glaber

Figure 16. *Ochetellus glaber* worker (MCZ-ENT00763401) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



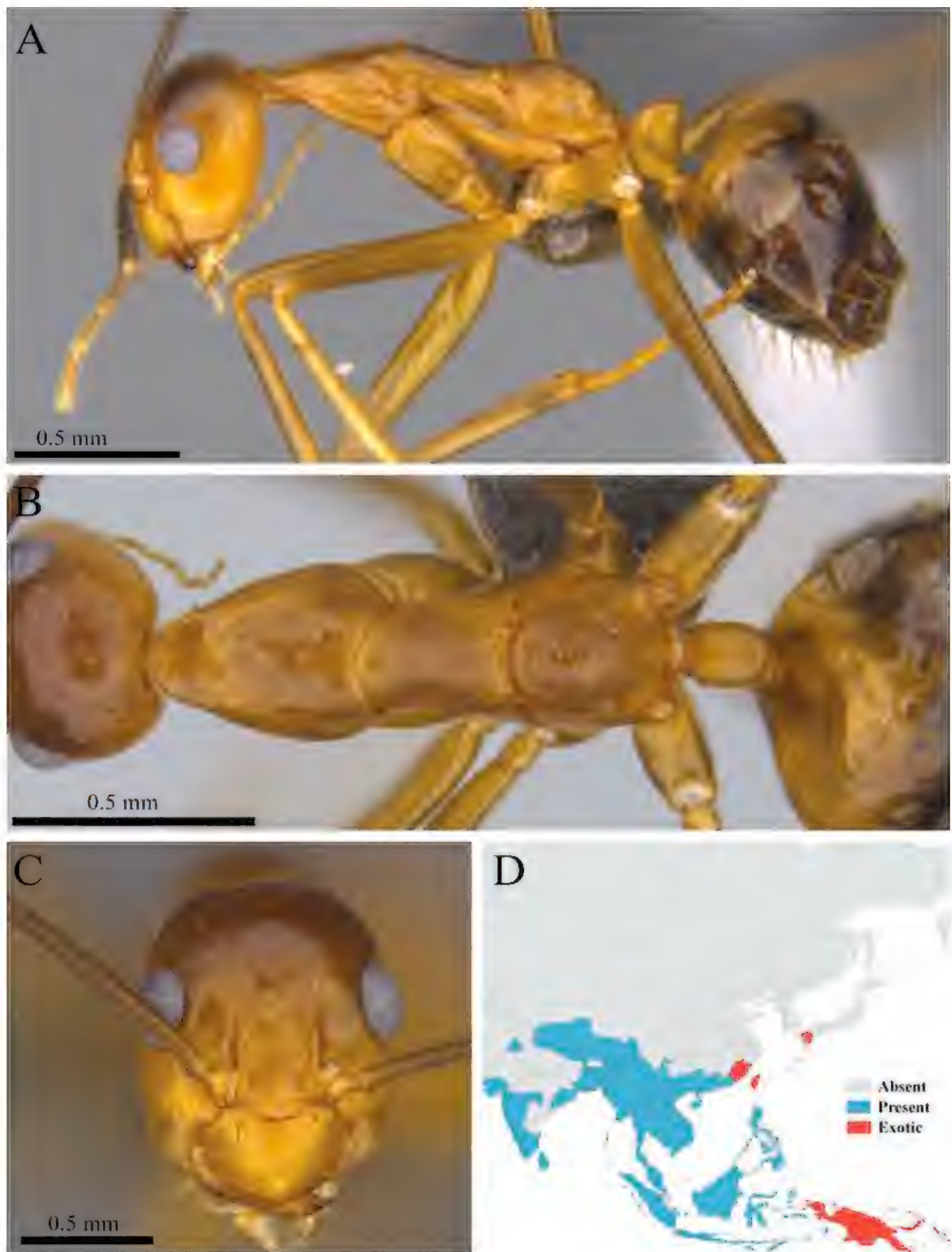
Tapinoma melanocephalum

Figure 17. *Tapinoma melanocephalum* worker (MCZ-ENT00760062) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



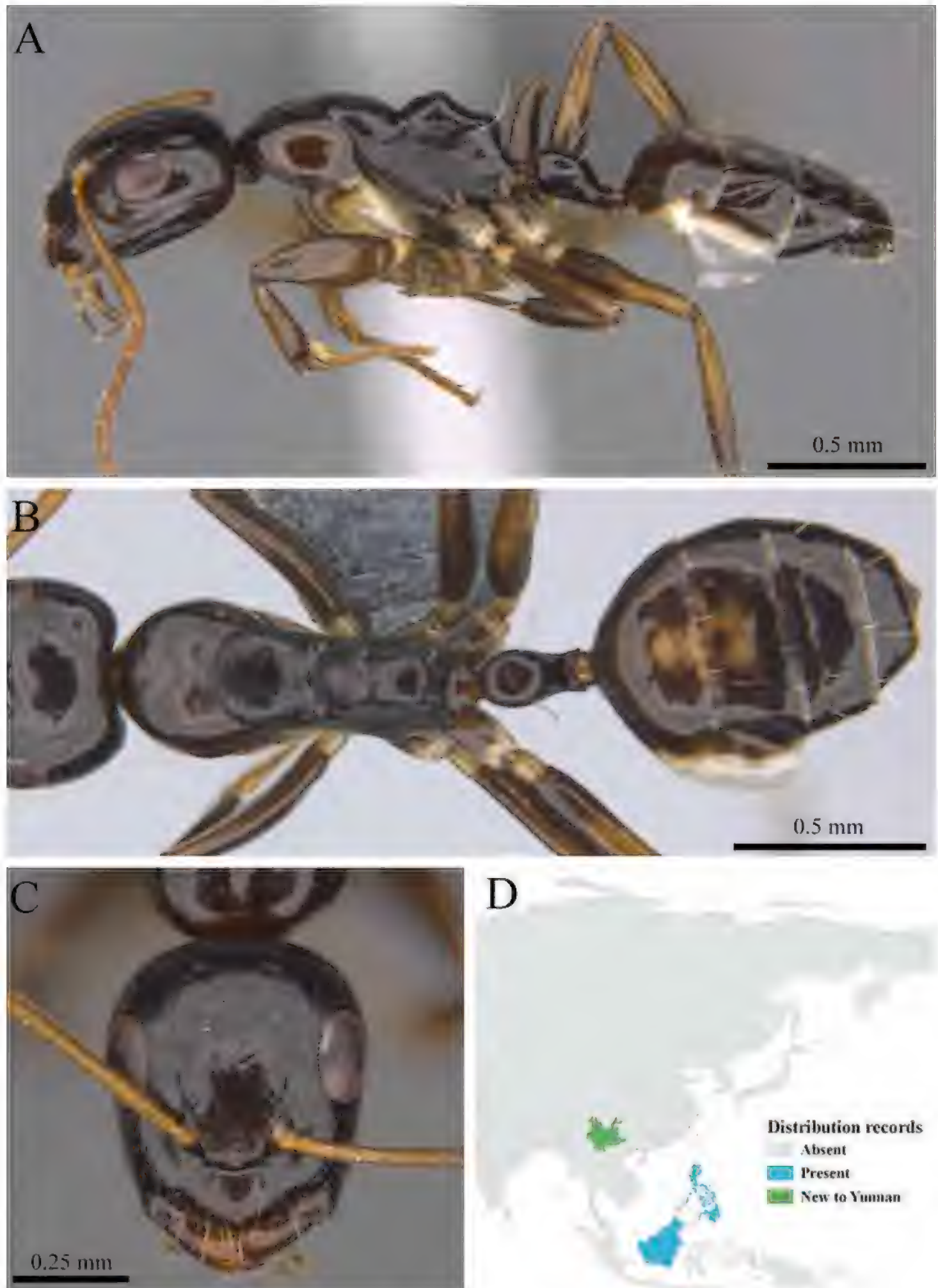
Gnamptogenys quadrutinodules

Figure 18. *Gnamptogenys quadrutinodules* worker (MCZ-ENT00759741) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



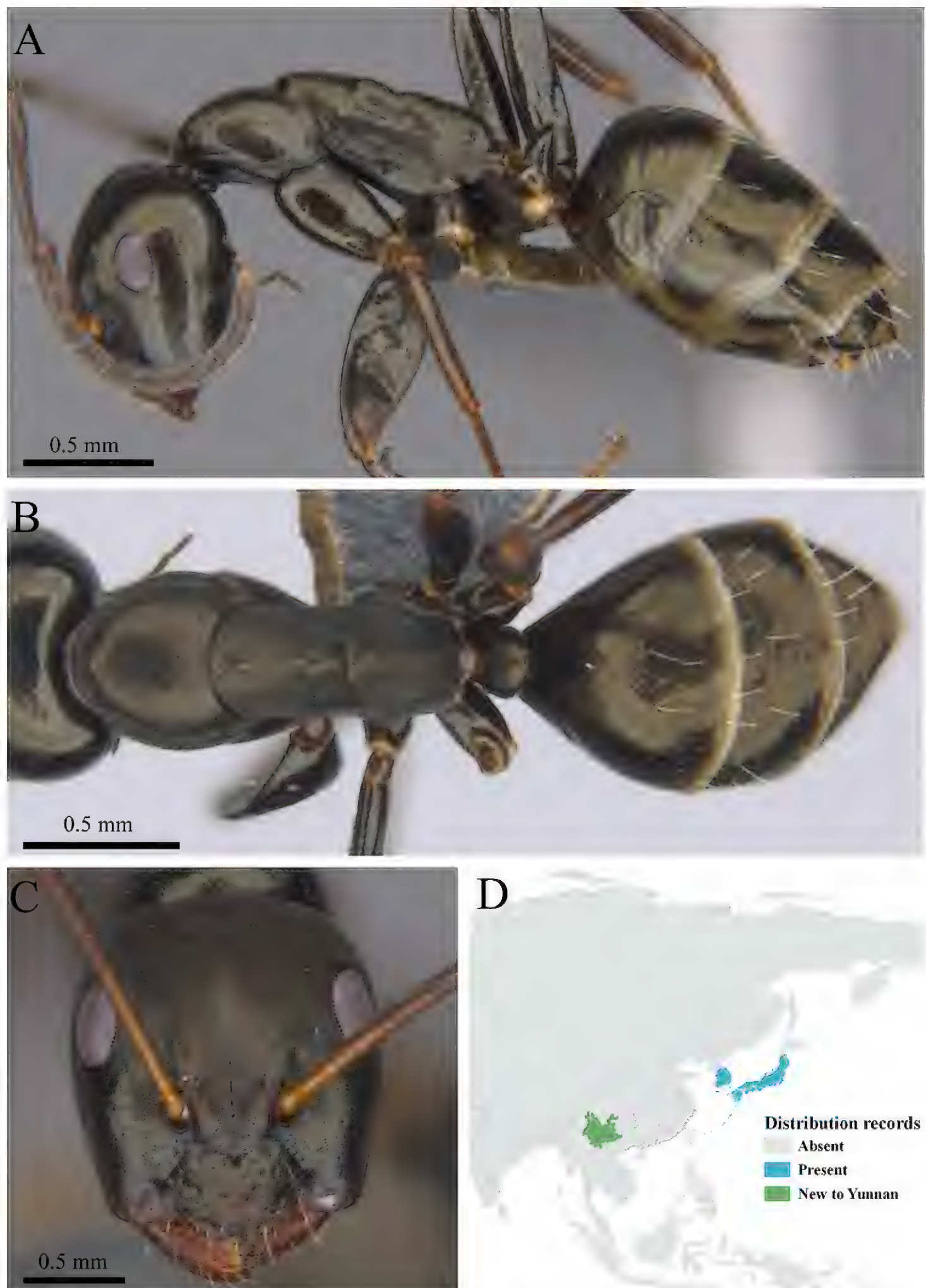
Anoplolepis gracilipes

Figure 19. *Anoplolepis gracilipes* worker (MCZ-ENT00760060) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



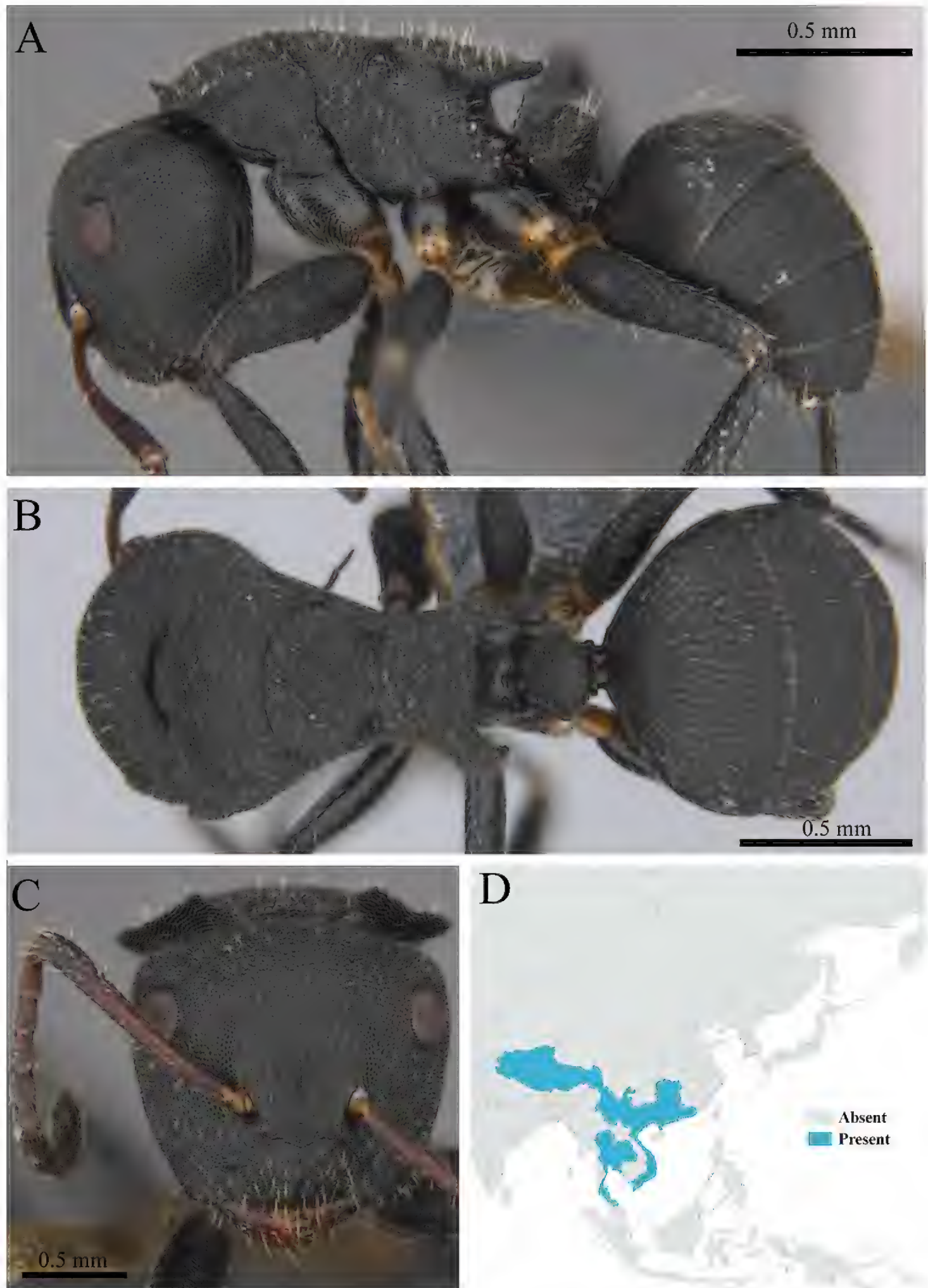
Camponotus bellus leucodiscus

Figure 20. *Camponotus bellus leucodiscus* worker (MCZ-ENT00760068, new to China) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



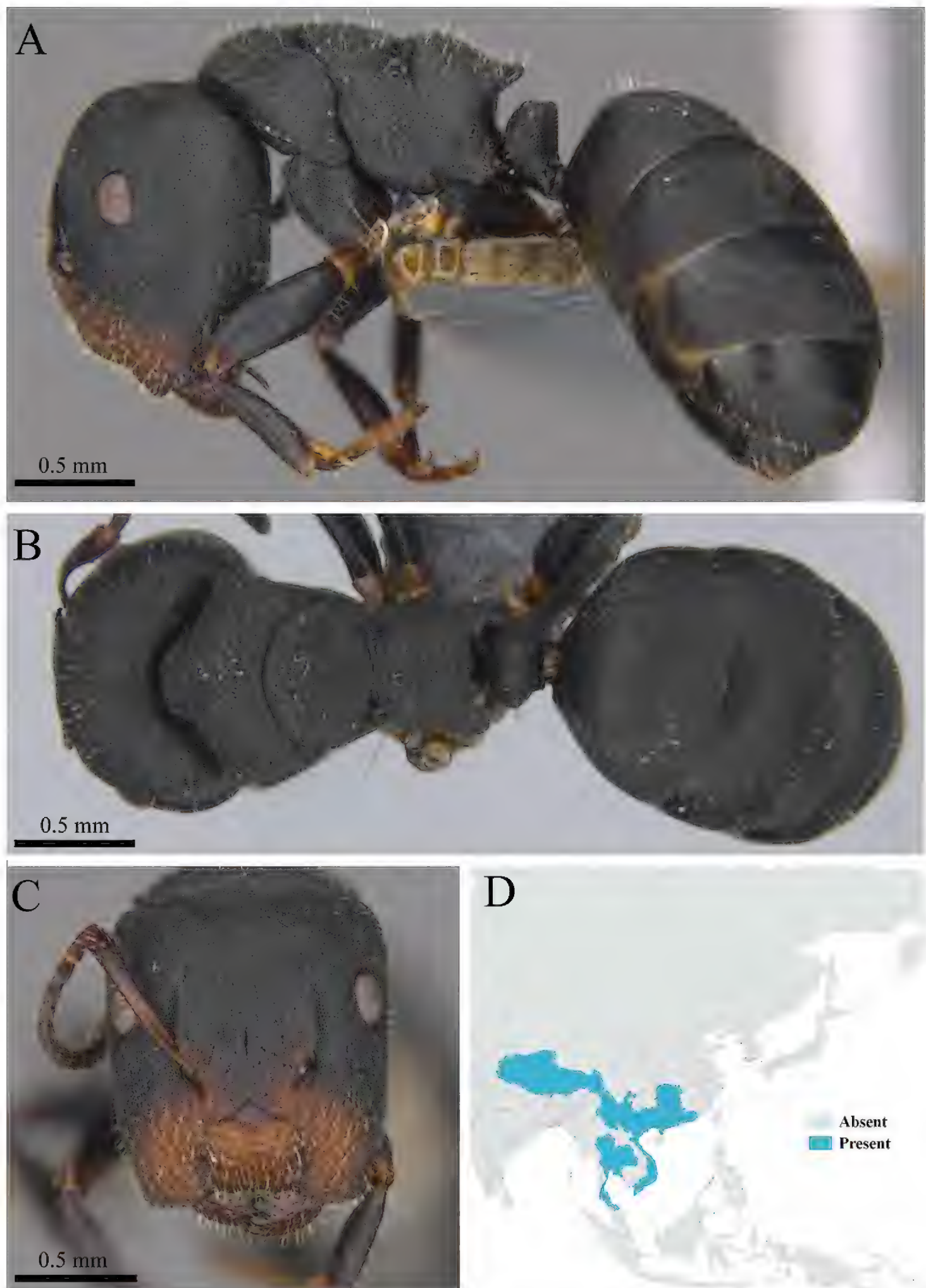
Camponotus keihitoi

Figure 21. *Camponotus keihitoi* worker (MCZ-ENT00763692, new to China) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



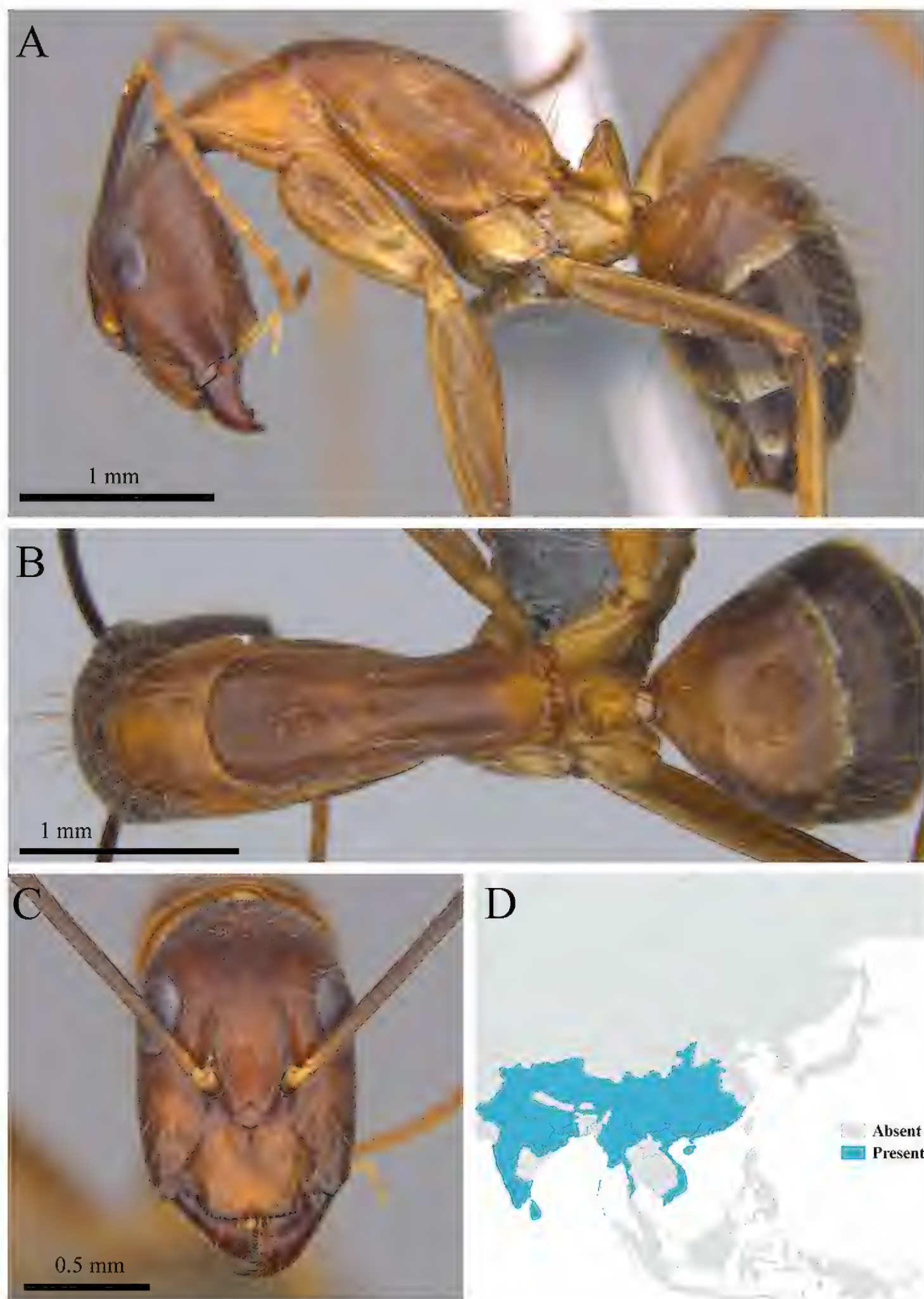
Camponotus lasiselene

Figure 22. *Camponotus lasiselene* minor worker (MCZ-ENT00763190) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



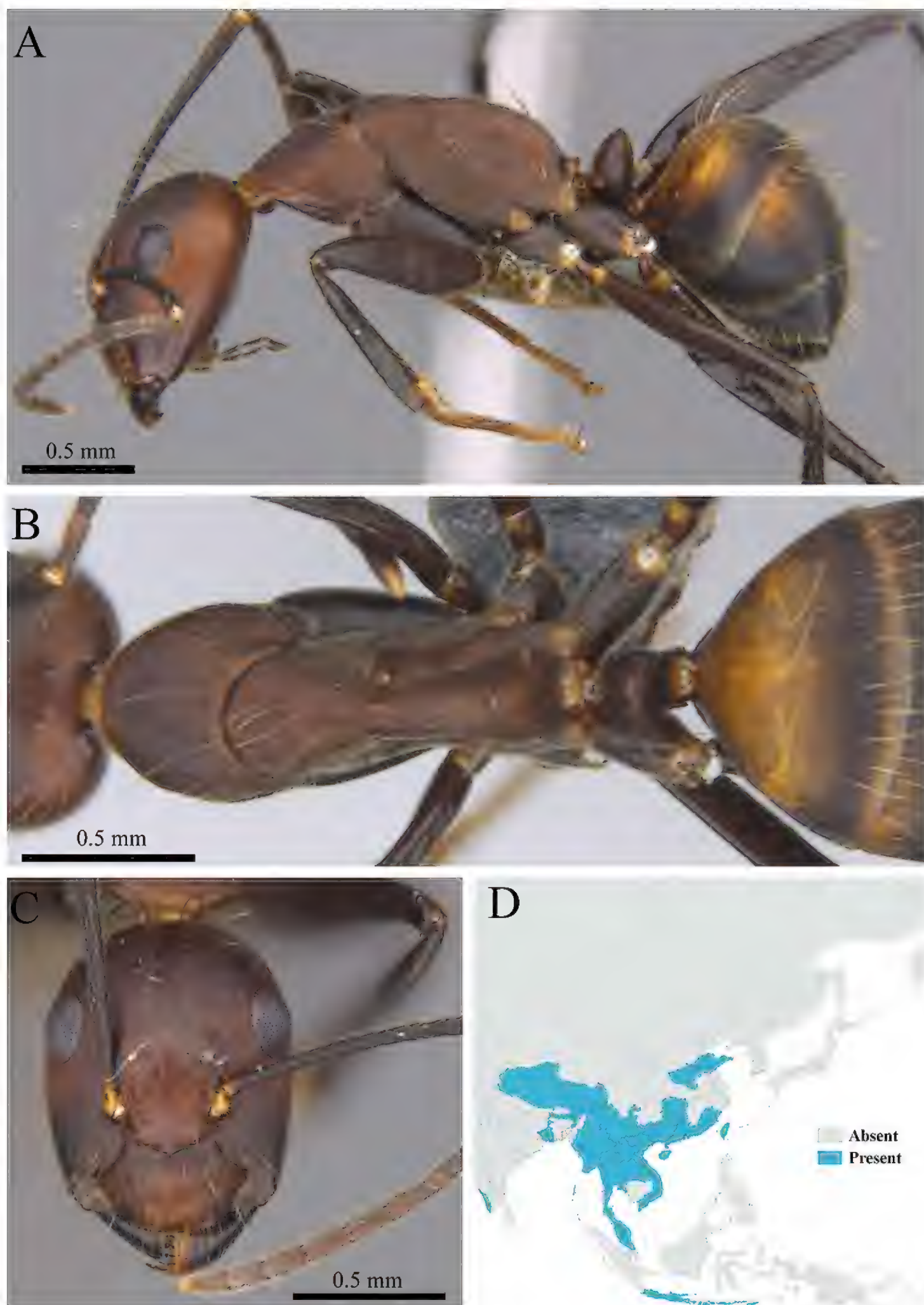
Camponotus lasiselene

Figure 23. *Camponotus lasiselene* major worker (MCZ-ENT00763247) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



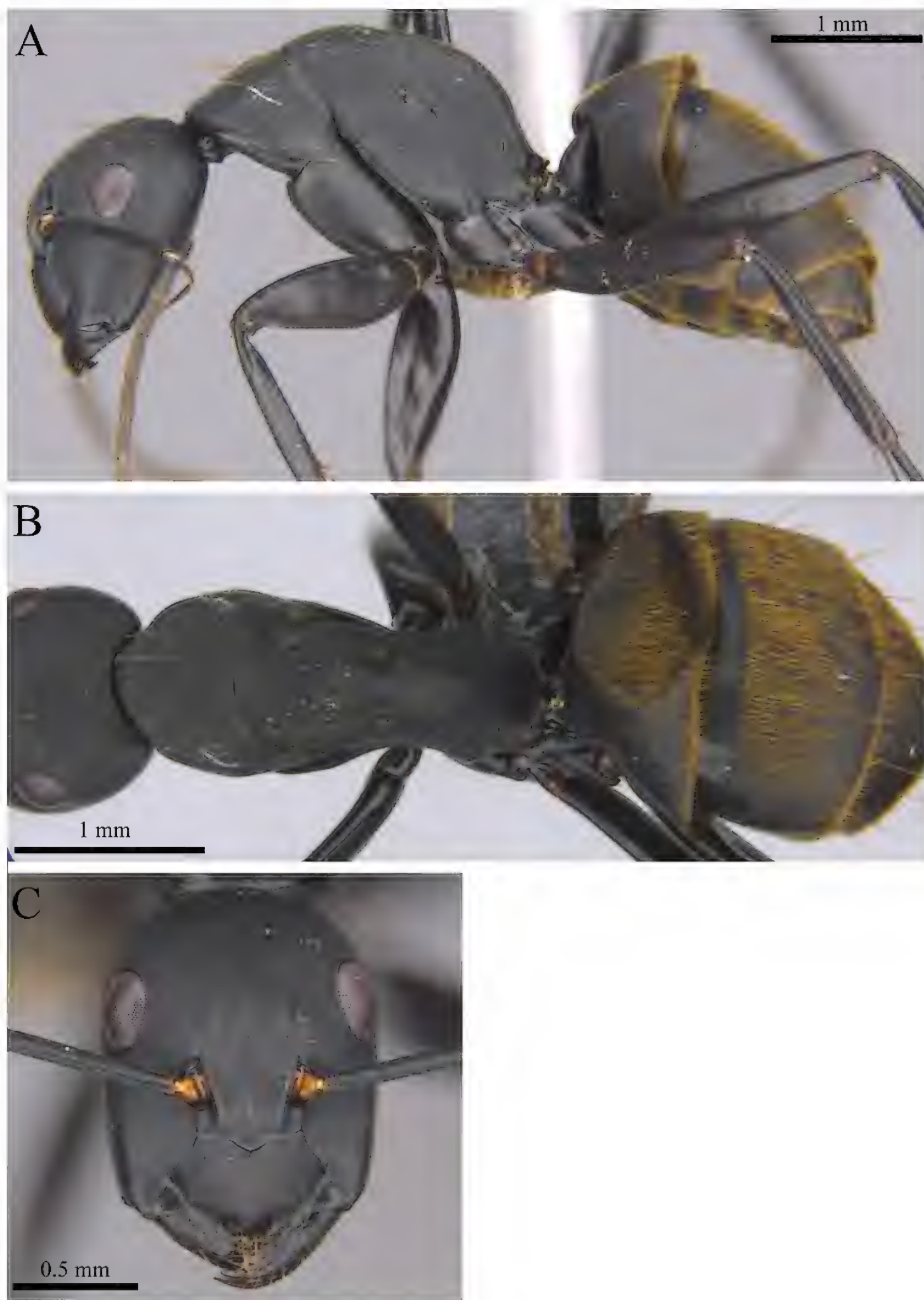
Camponotus mitis

Figure 24. *Camponotus mitis* worker (MCZ-ENT00763213) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



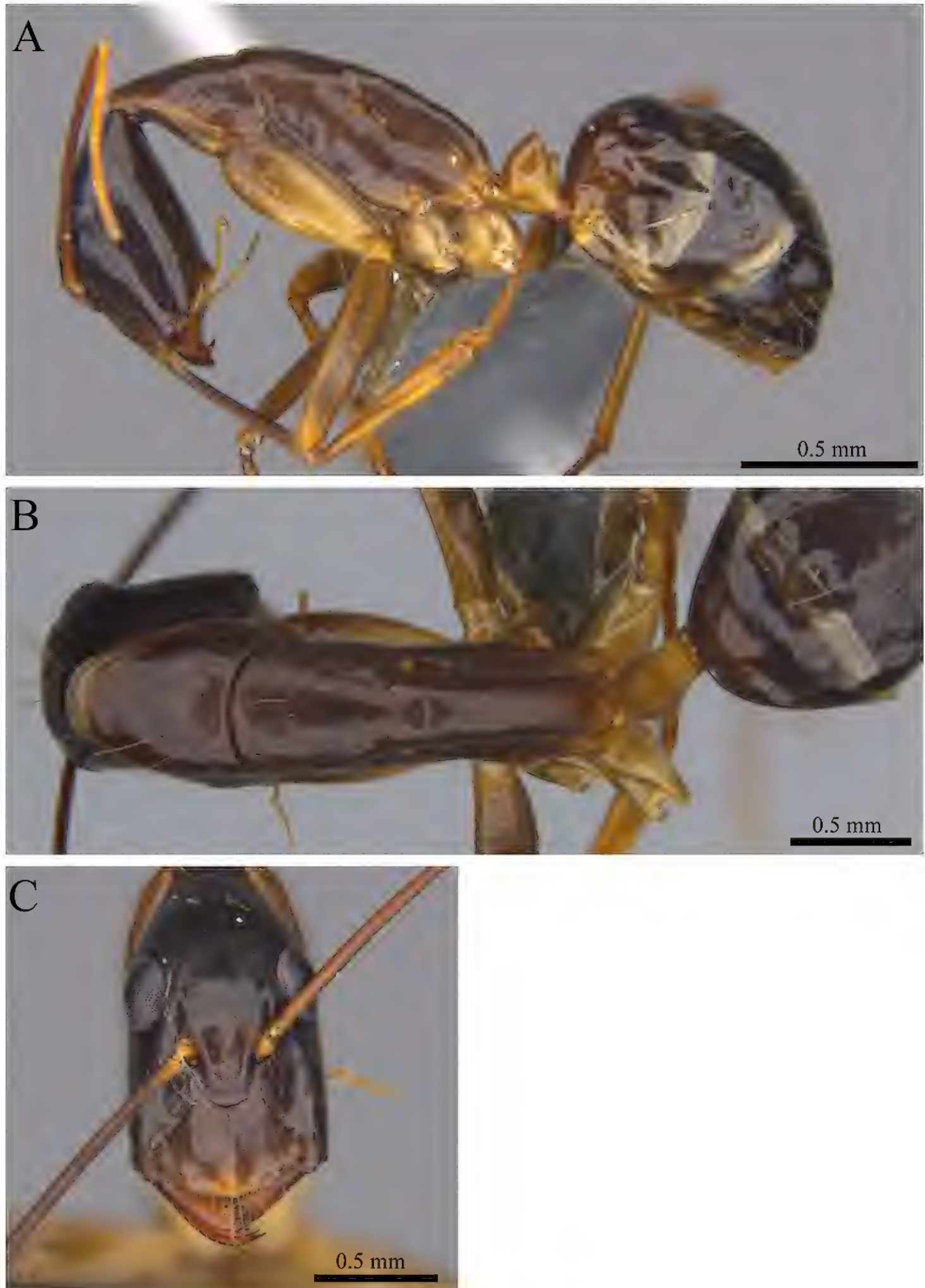
Camponotus nicobarensis

Figure 25. *Camponotus nicobarensis* worker (MCZ-ENT00763198) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



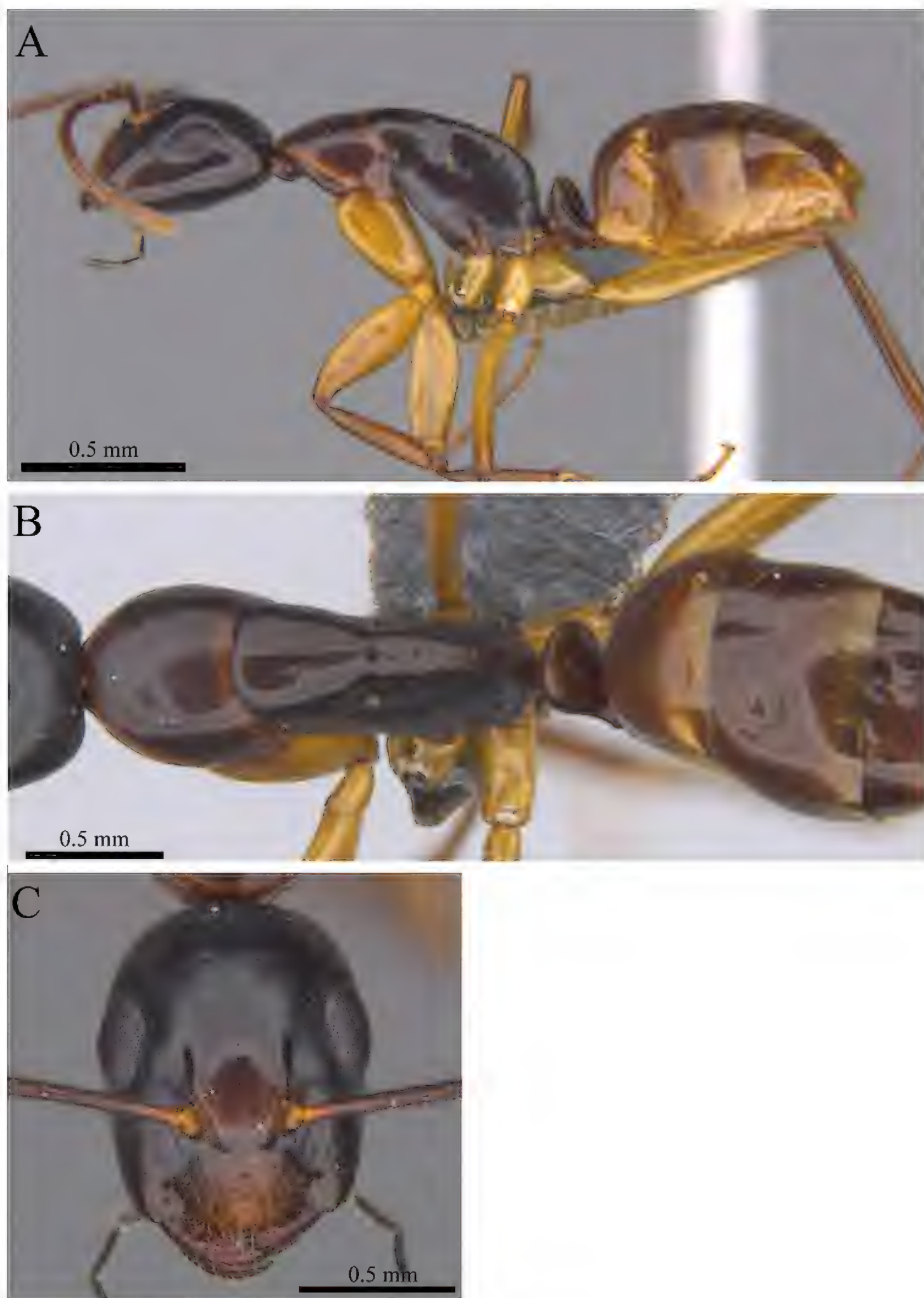
Camponotus sp1

Figure 26. *Camponotus* sp. clm01 worker (MCZ-ENT00762843) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



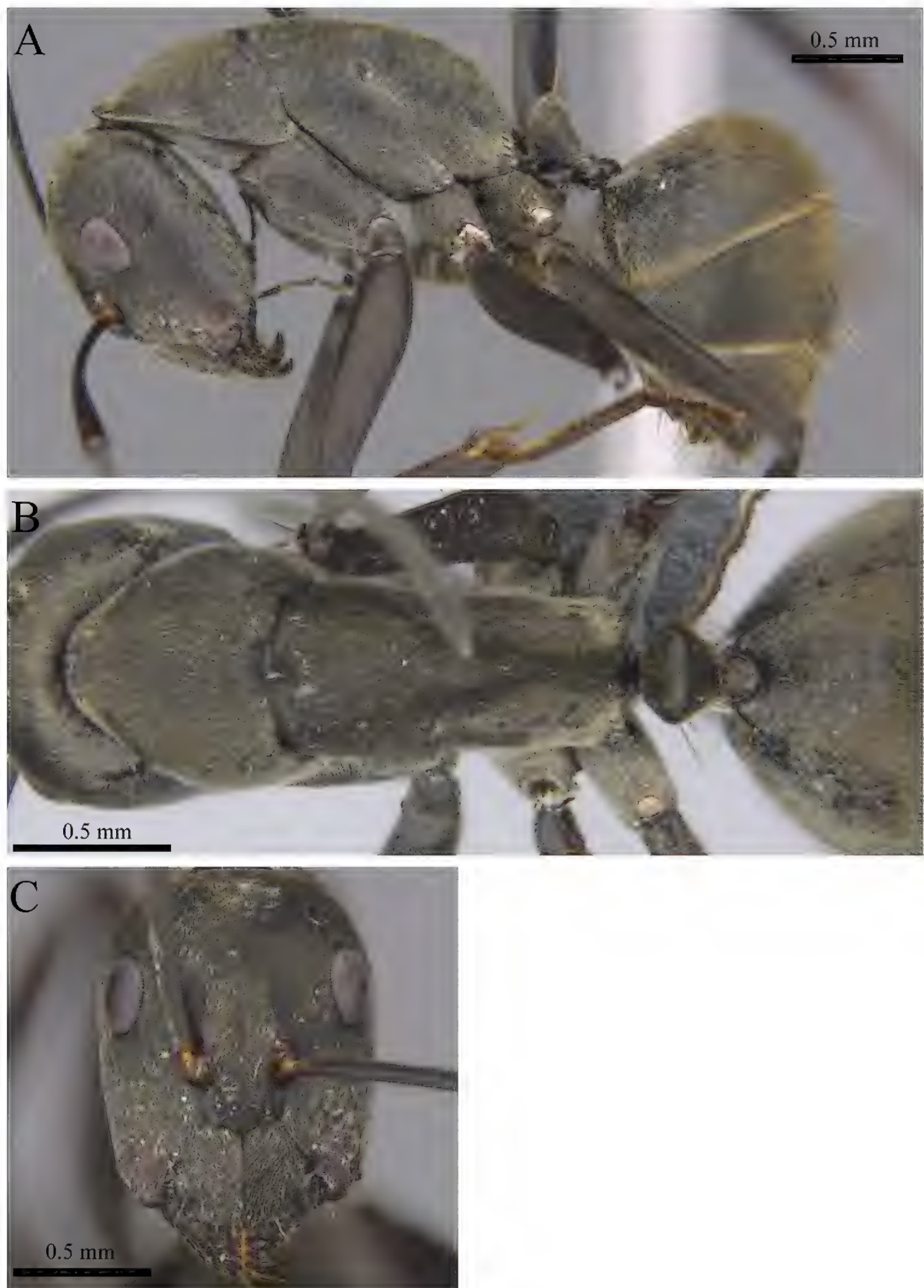
Camponotus sp2

Figure 27. *Camponotus* sp. clm02 worker (MCZ-ENT00759861) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



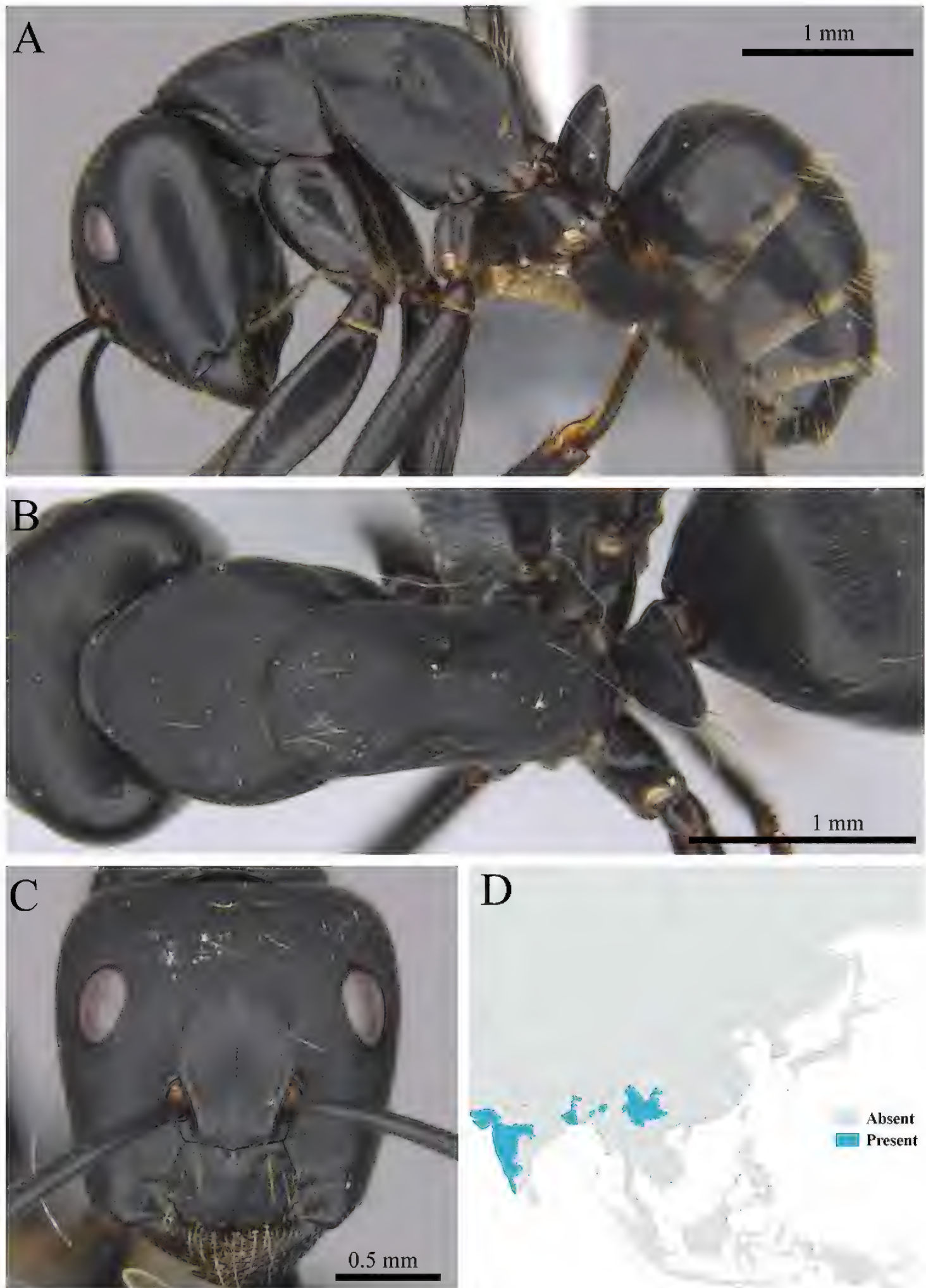
Camponotus sp3

Figure 28. *Camponotus* sp. clm03 worker (MCZ-ENT00762821) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



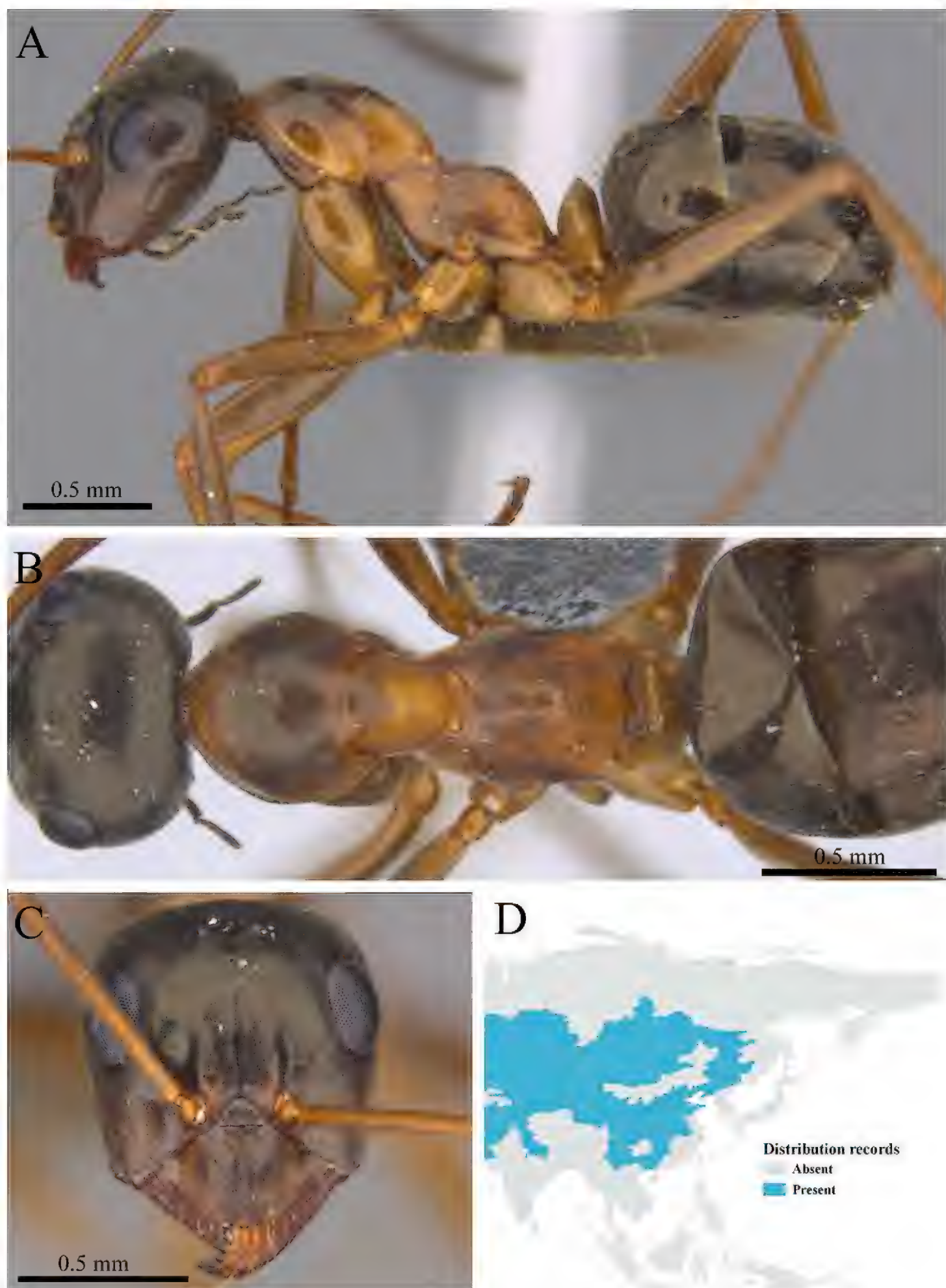
Camponotus sp4

Figure 29. *Camponotus* sp. clm04 worker (MCZ-ENT00762978) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



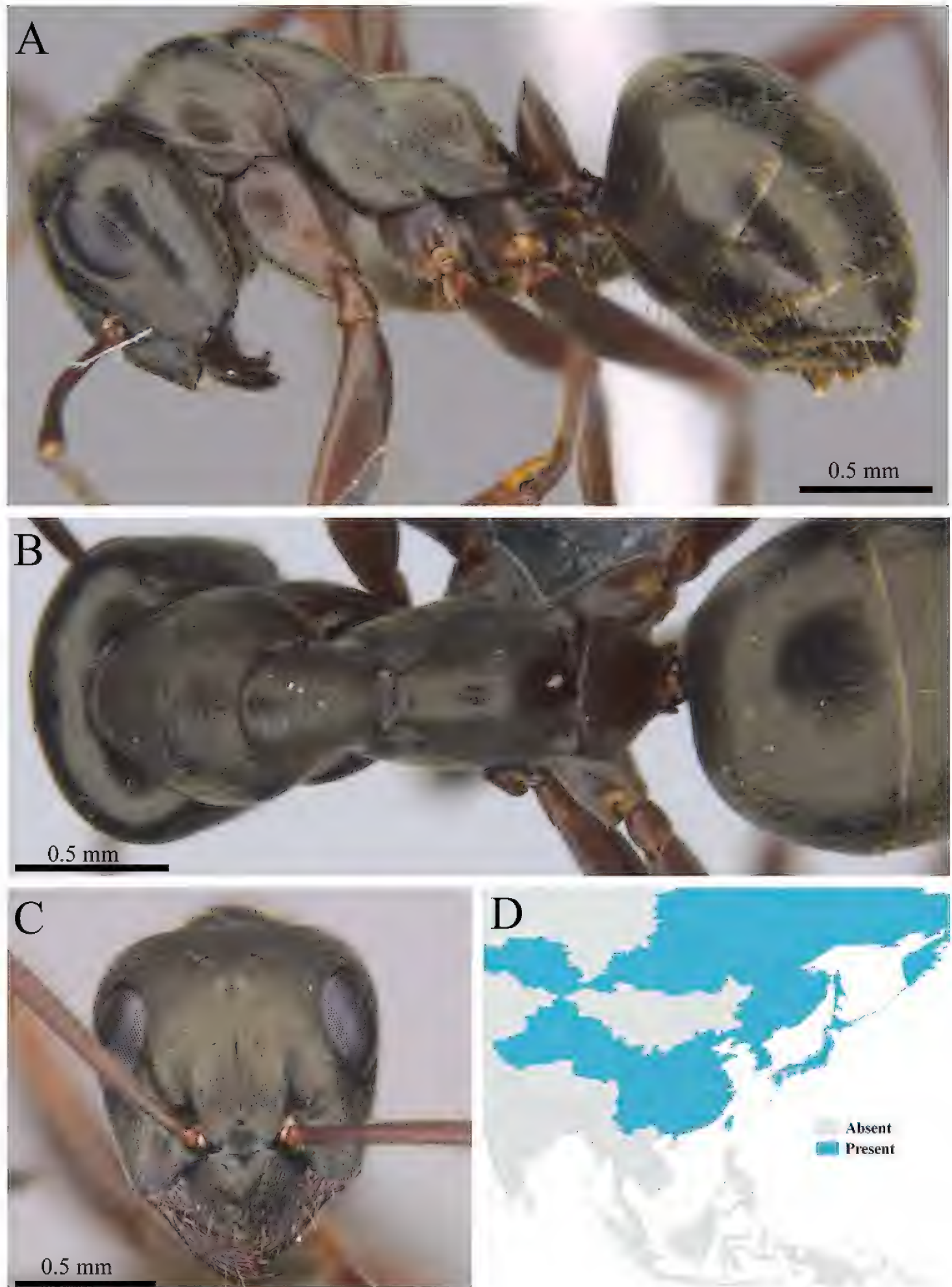
Camponotus sp5

Figure 30. *Camponotus* sp. clm05 worker (MCZ-ENT00763312) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



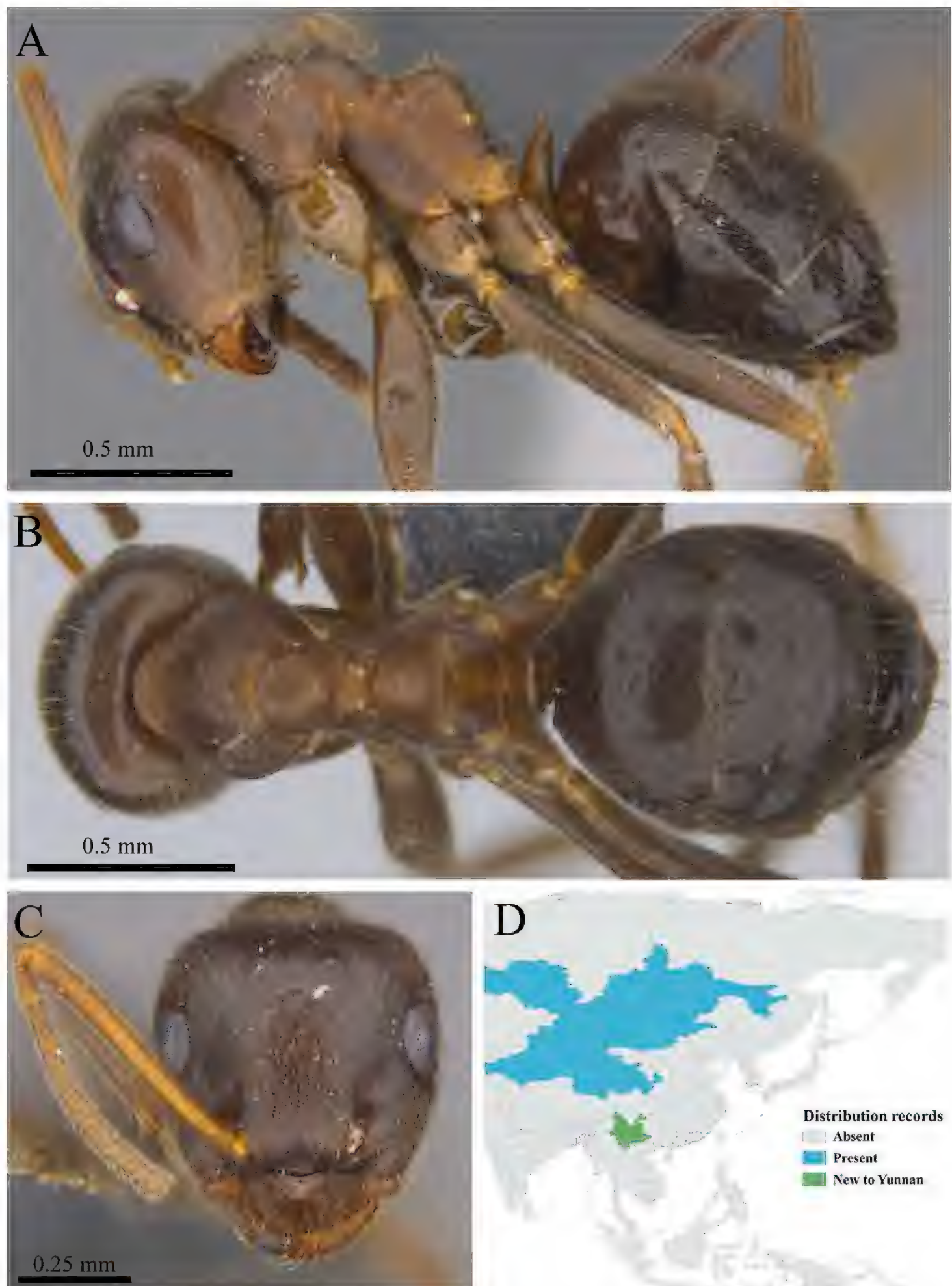
Formica cunicularia

Figure 31. *Formica cunicularia* worker (MCZ-ENT00759967) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



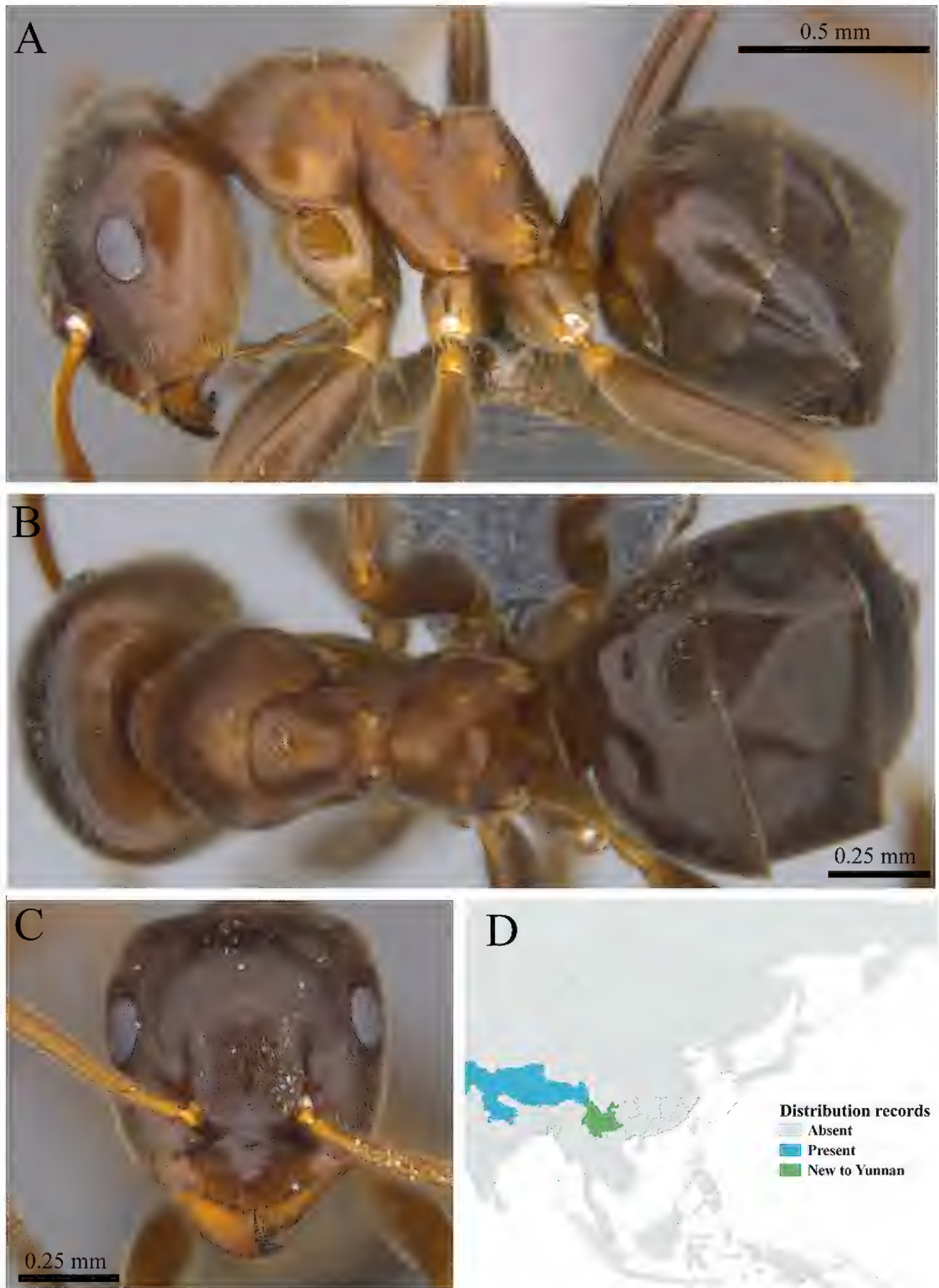
Formica japonica

Figure 32. *Formica japonica* worker (MCZ-ENT00760066) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



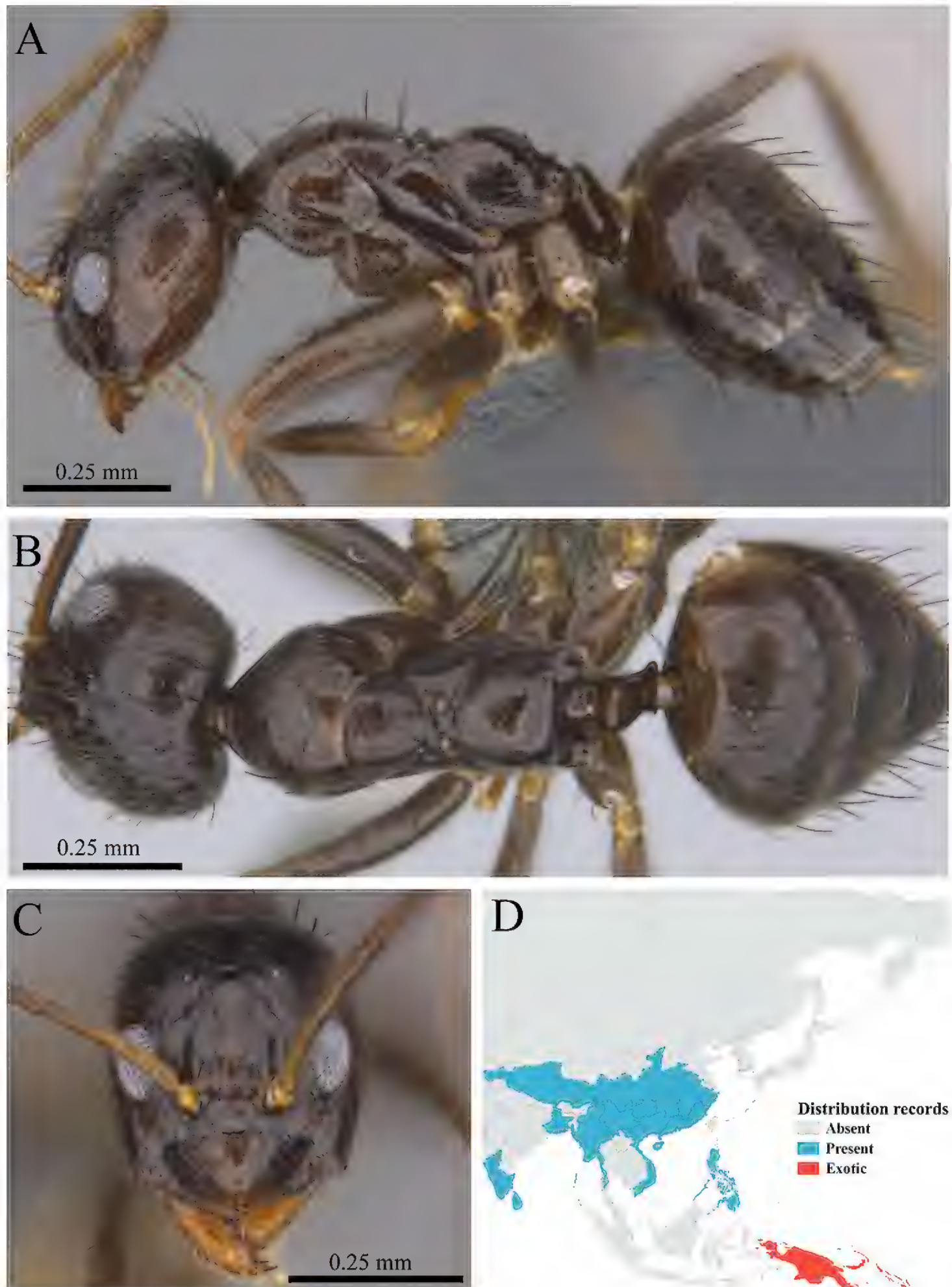
Lasius obscuratus

Figure 33. *Lasius obscuratus* worker (MCZ-ENT00760025, new to Yunnan) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



Lasius himalayanus

Figure 34. *Lasius himalayanus* worker (MCZ-ENT00763360, new to Yunnan) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



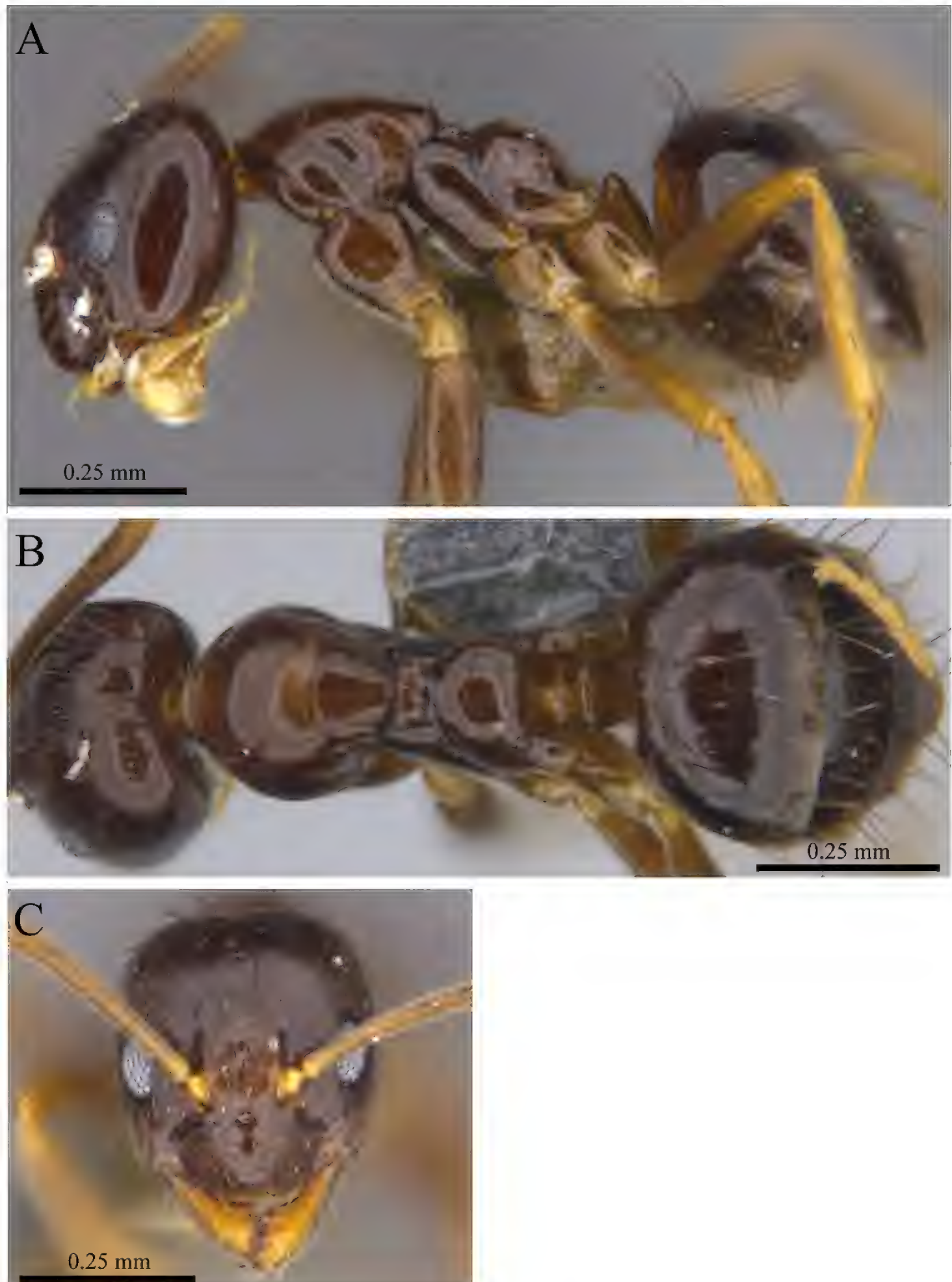
Nylanderia bourbonica

Figure 35. *Nylanderia bourbonica* worker (MCZ-ENT00760019) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



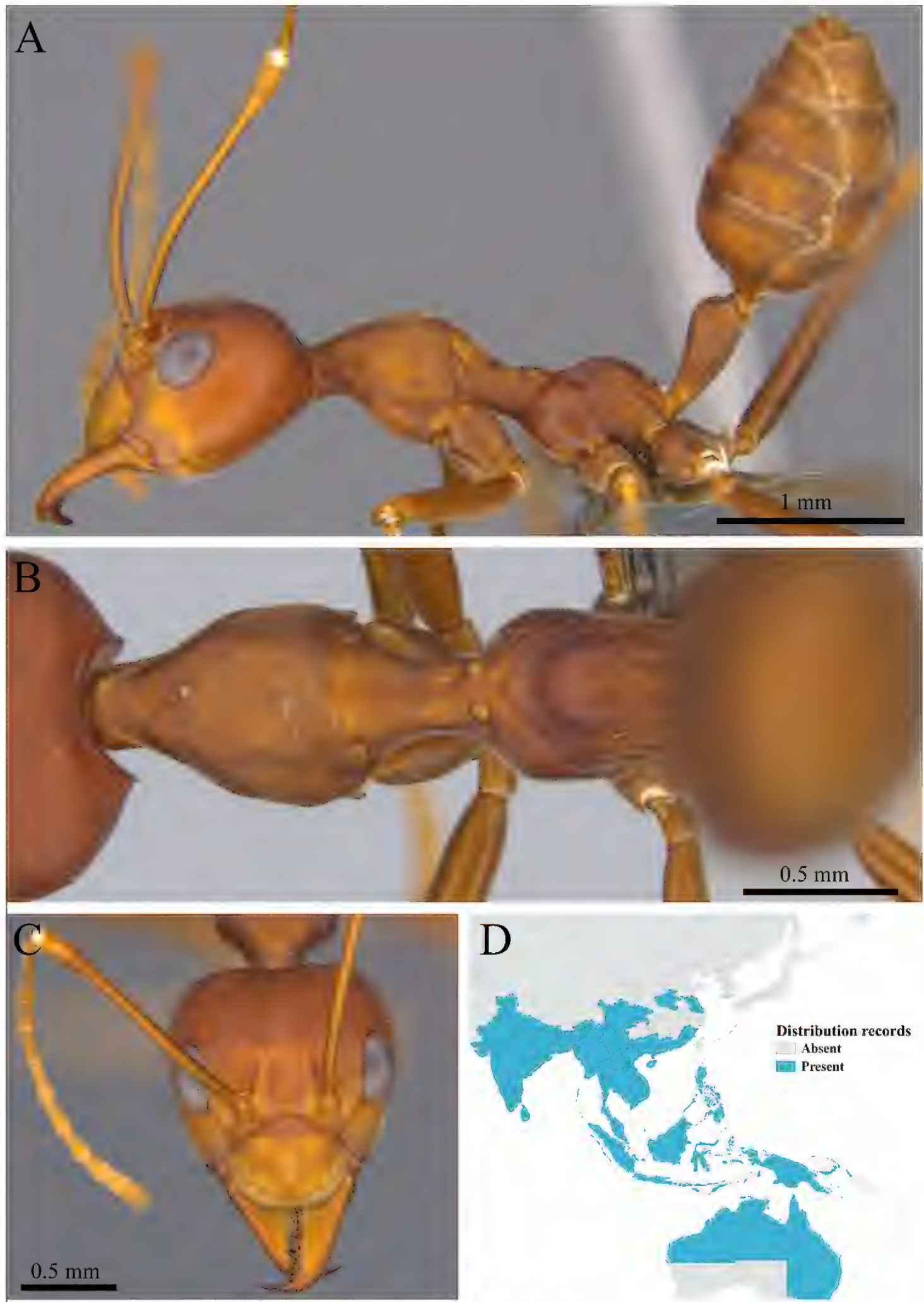
Nylanderia sp1

Figure 36. *Nylanderia* sp. clm01 worker (MCZ-ENT00759776) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



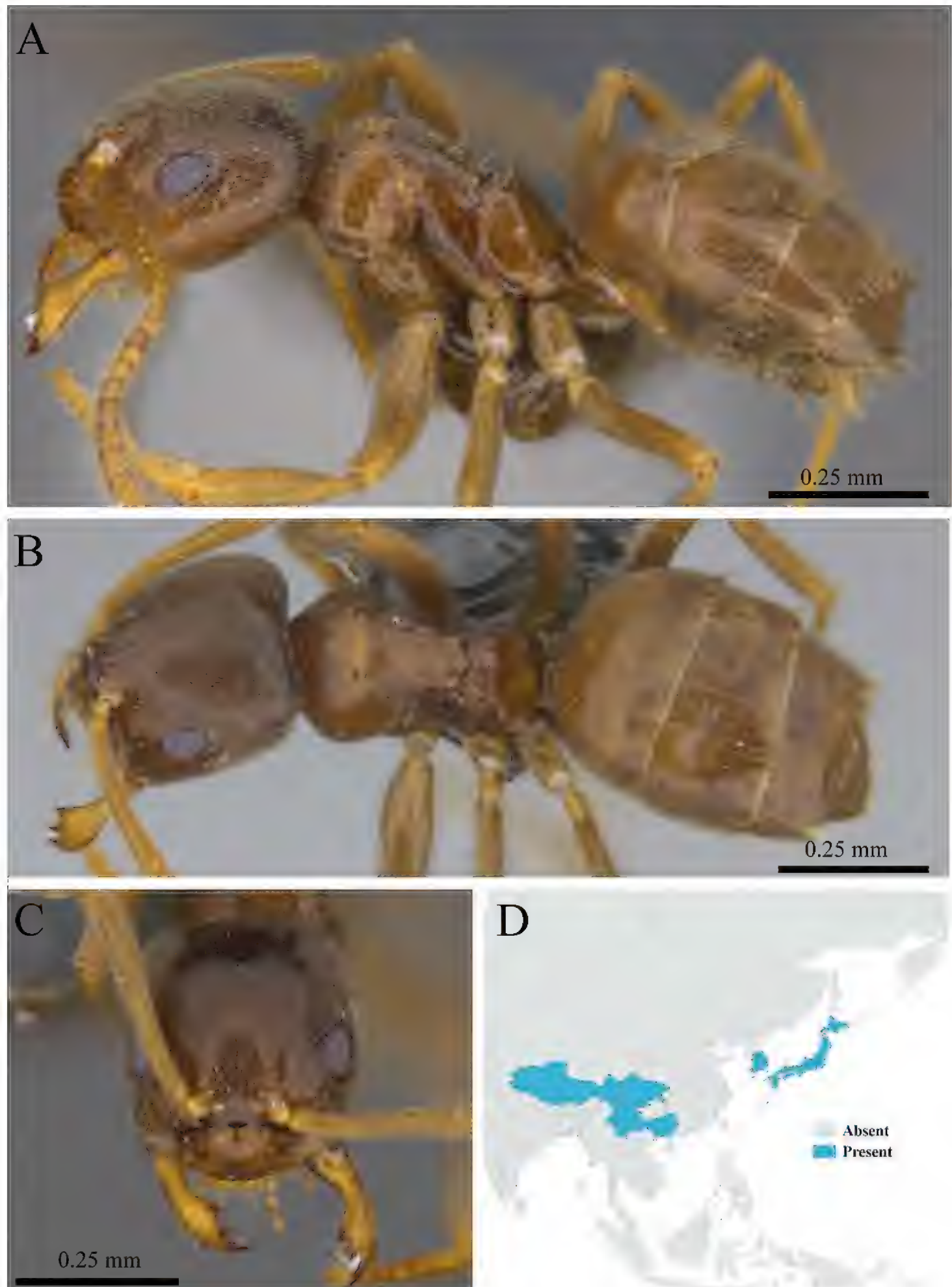
Nylanderia sp2

Figure 37. *Nylanderia* sp. clm02 worker (MCZ-ENT00759968) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



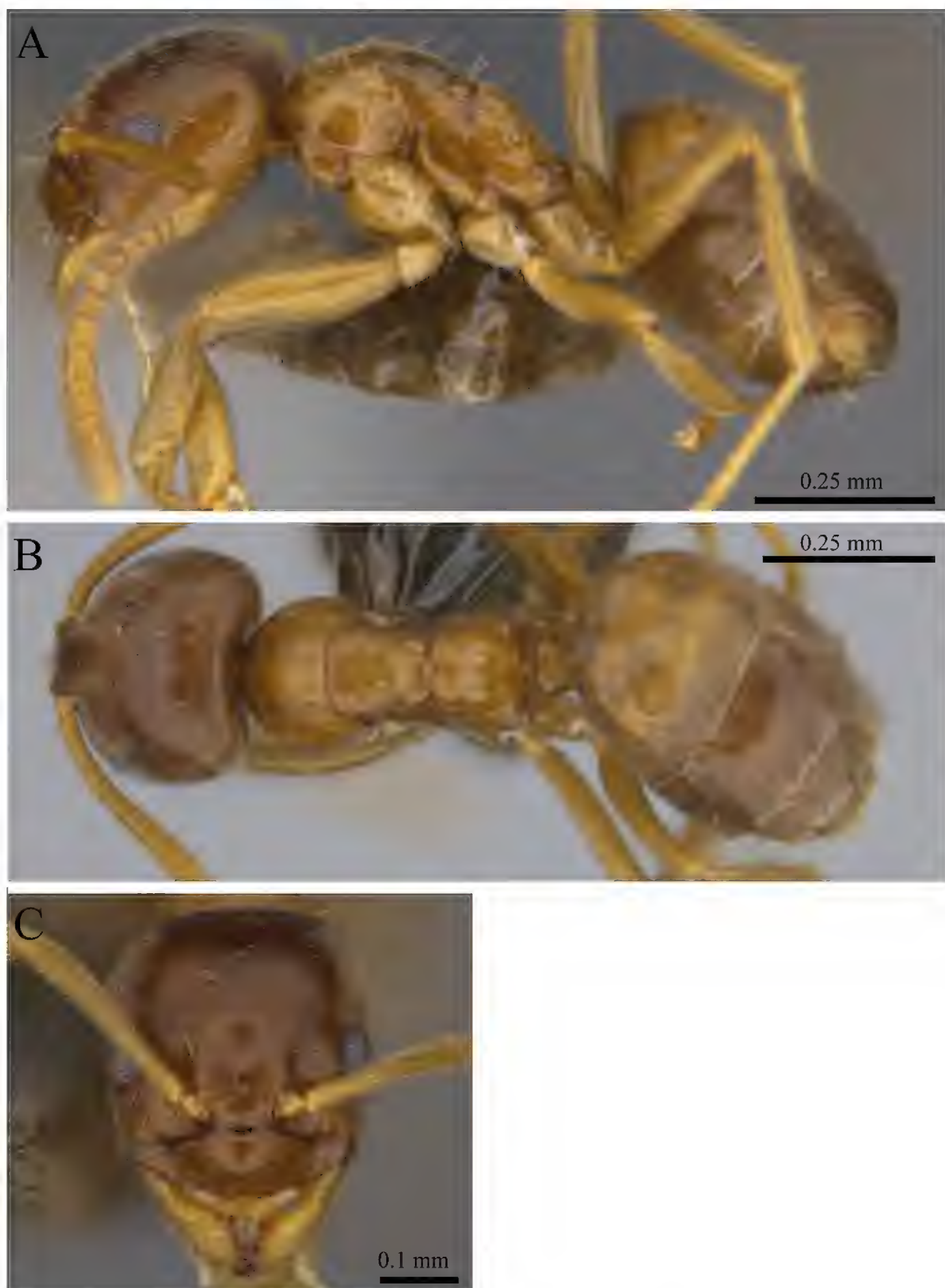
Oecophylla smaragdina

Figure 38. *Oecophylla smaragdina* worker (MCZ-ENT00763551) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



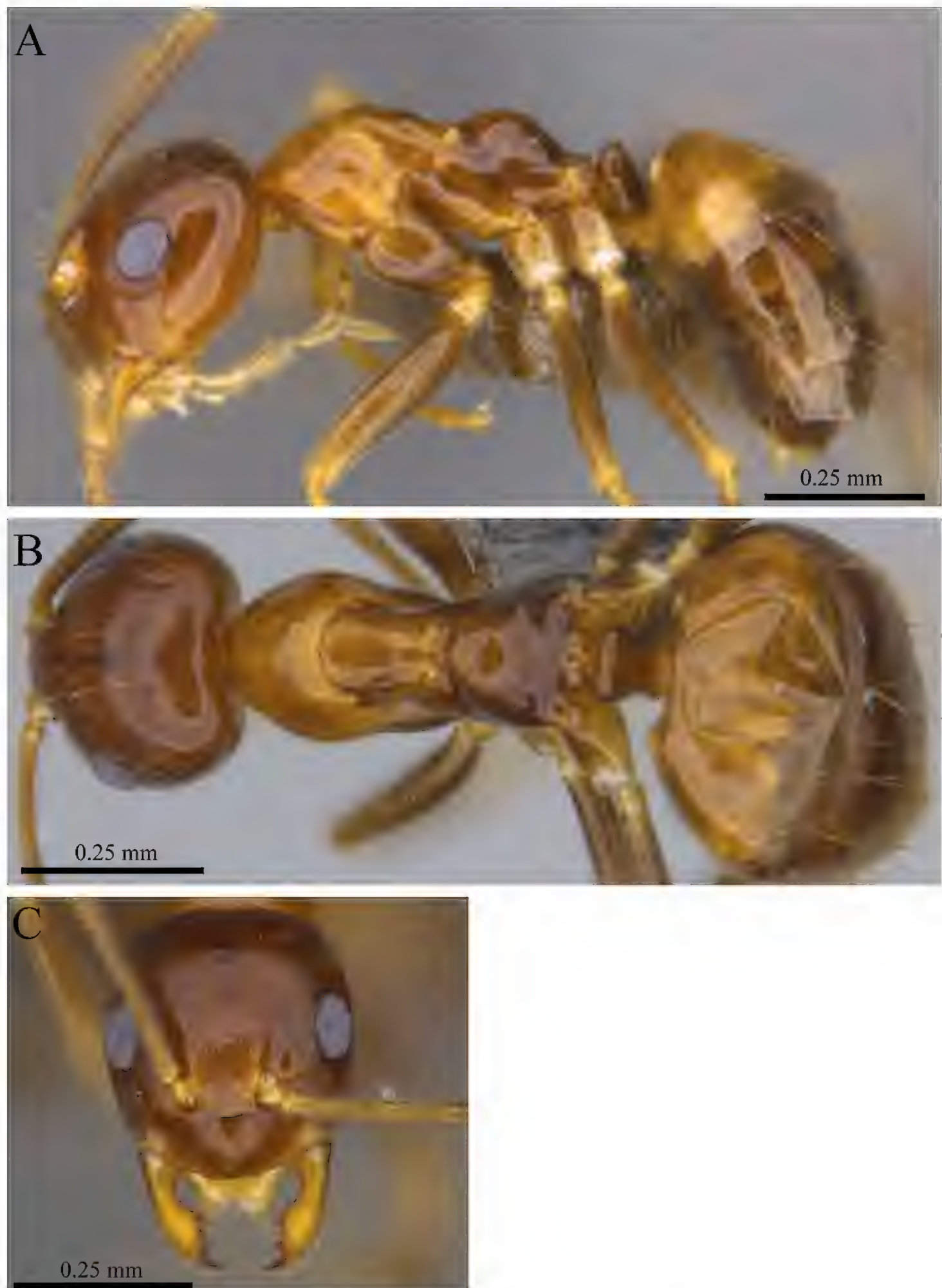
Paraparatrechina sakurae

Figure 39. *Paraparatrechina sakurae* worker (MCZ-ENT00759953) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



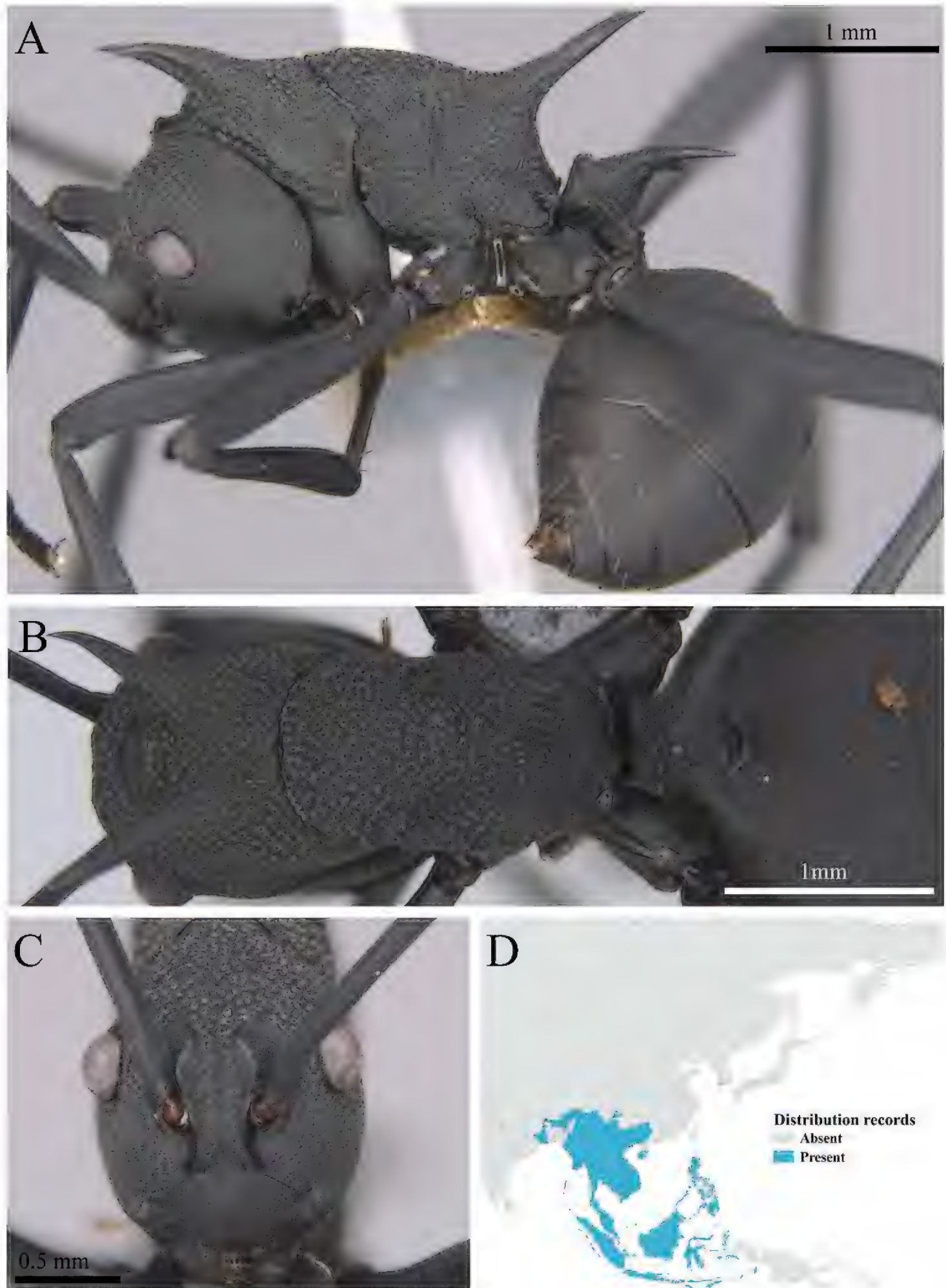
Paraparatrechina sp1

Figure 40. *Paraparatrechina* sp. clm01 worker (MCZ-ENT00763500) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



Paraparatrechina sp2

Figure 41. *Paraparatrechina* sp. clm02 worker (MCZ-ENT00763427) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



Polyrhachis armata

Figure 42. *Polyrhachis armata* worker (MCZ-ENT00763282) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.

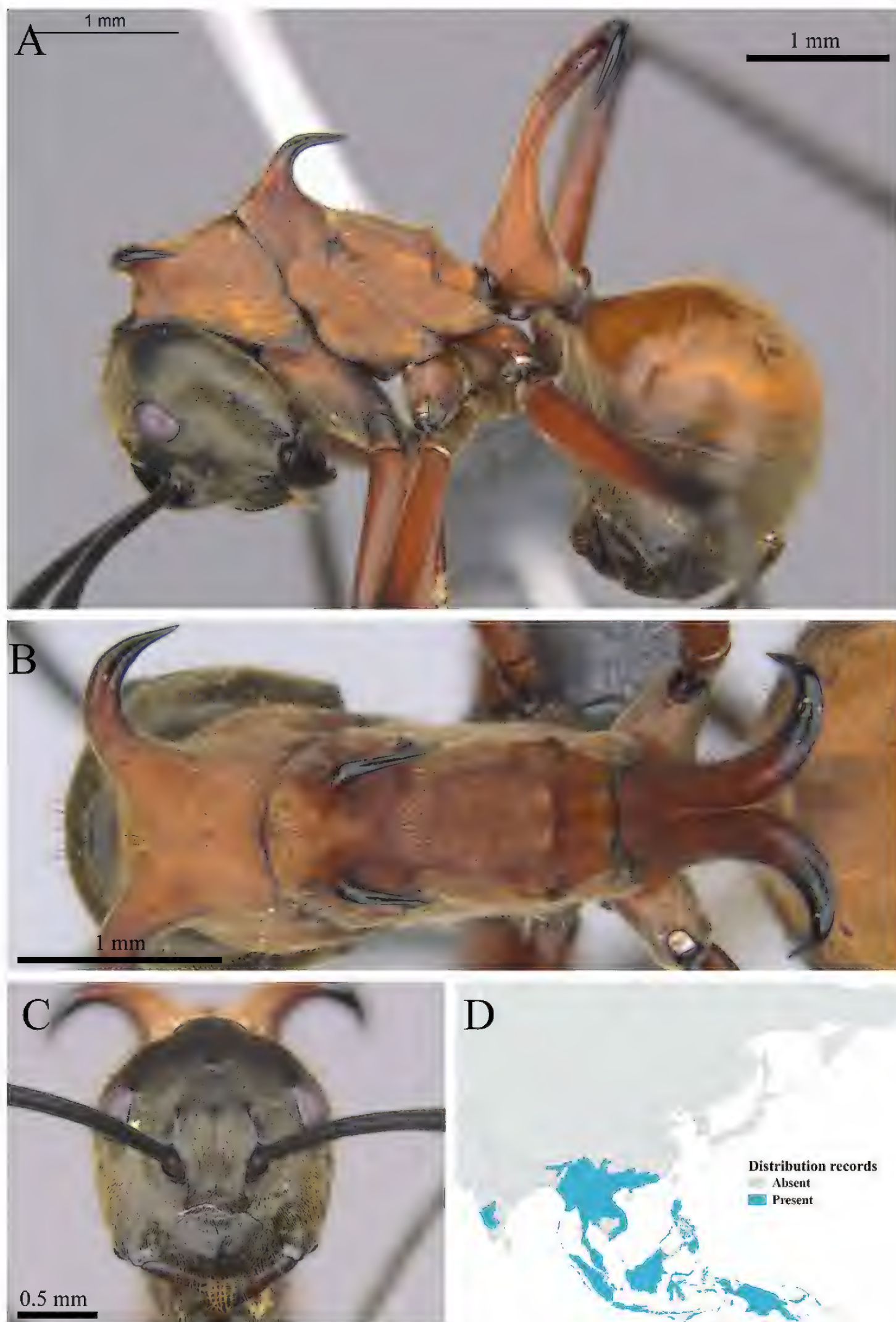
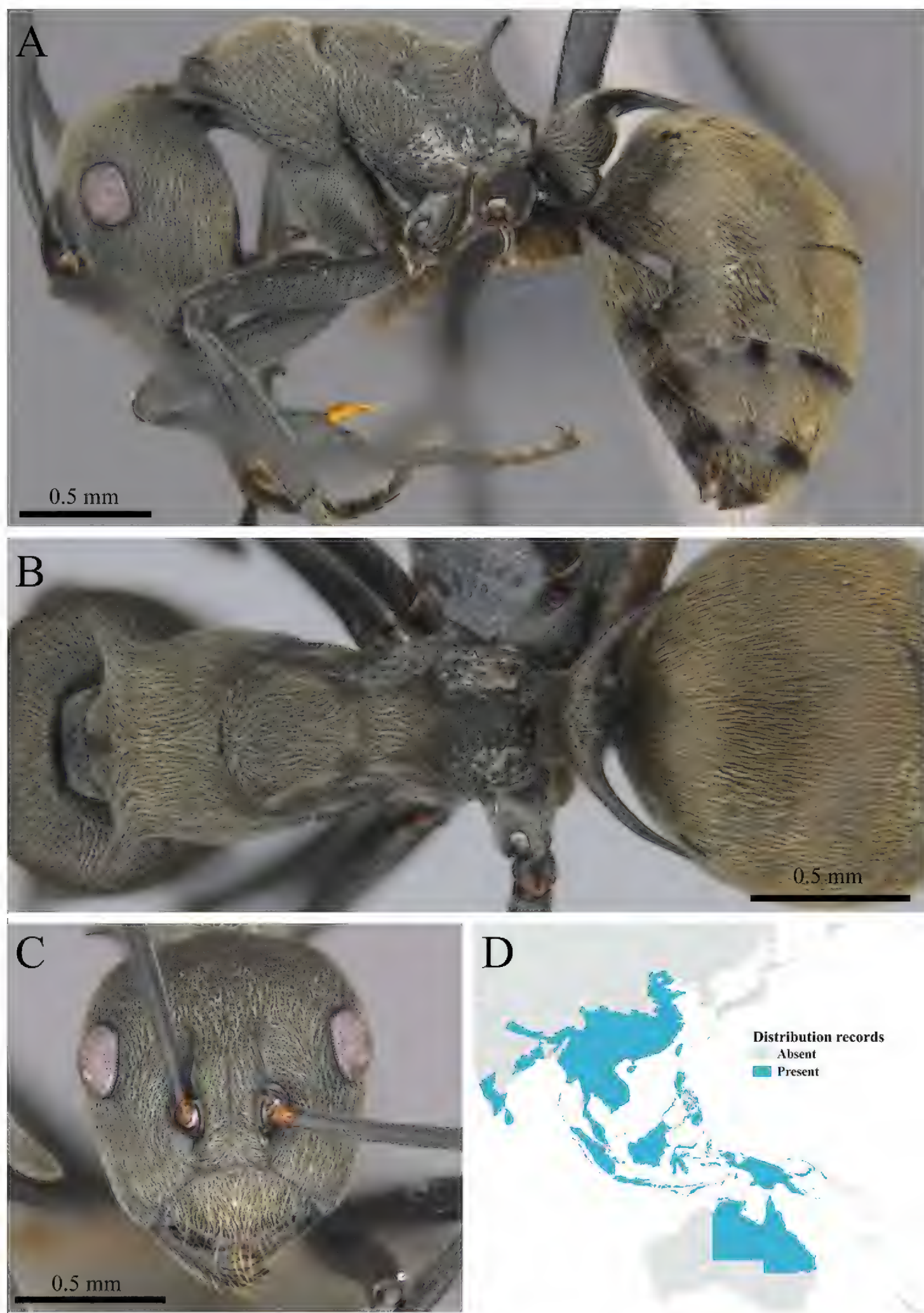
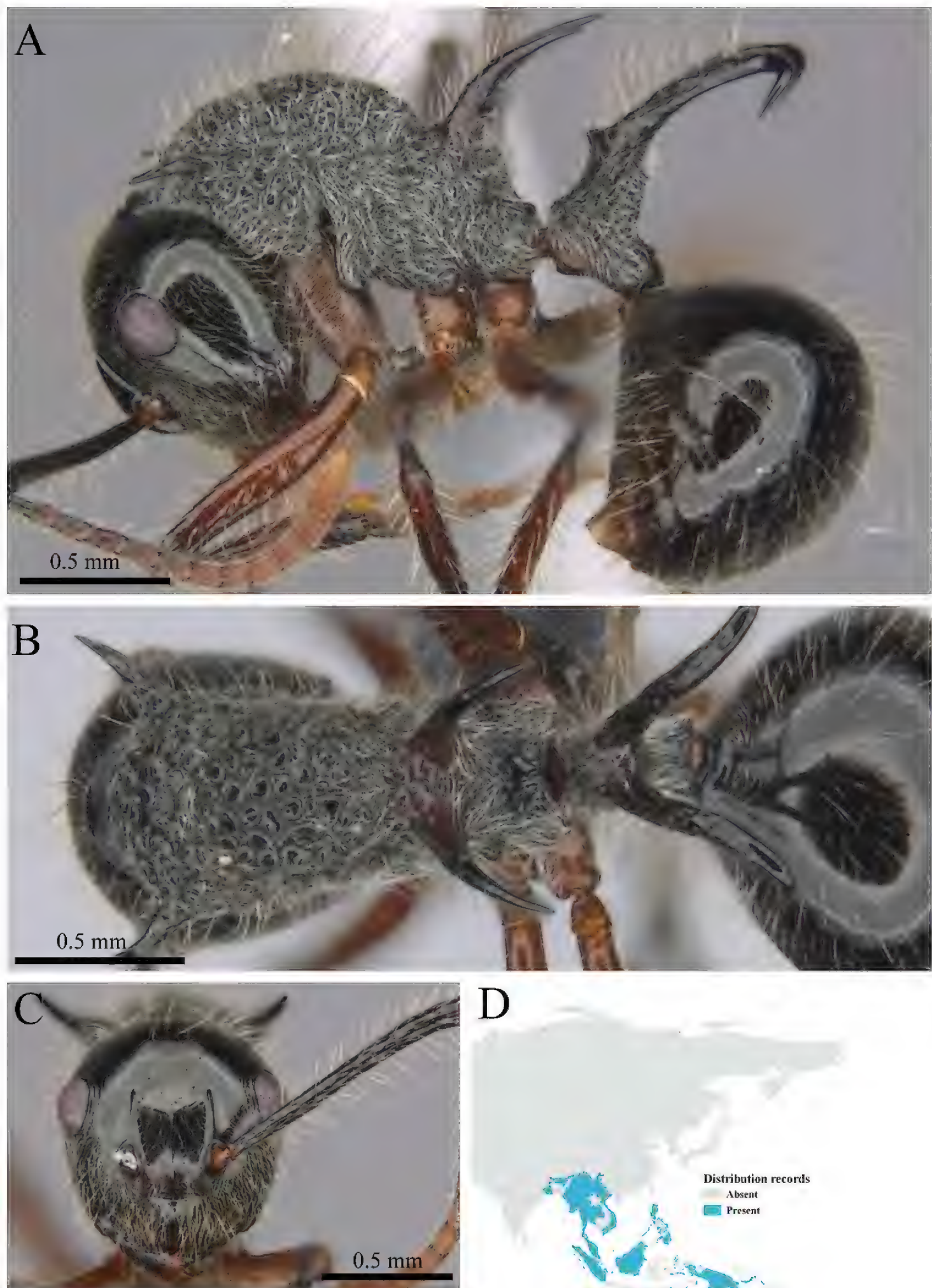


Figure 43. *Polyrhachis bihamata* worker (MCZ-ENT00763176). **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



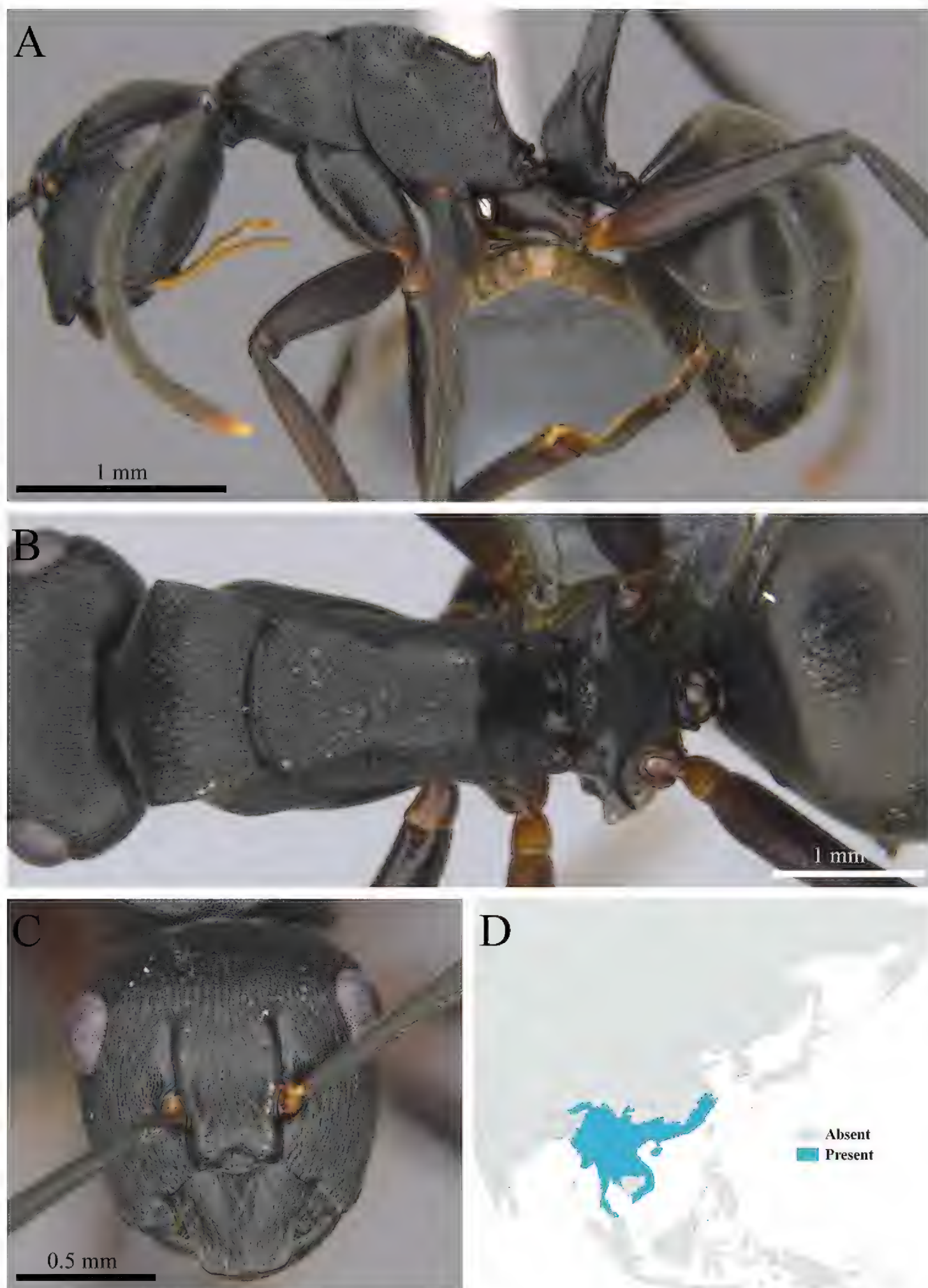
Polyrhachis dives

Figure 44. *Polyrhachis dives* worker (MCZ-ENT00760042). **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



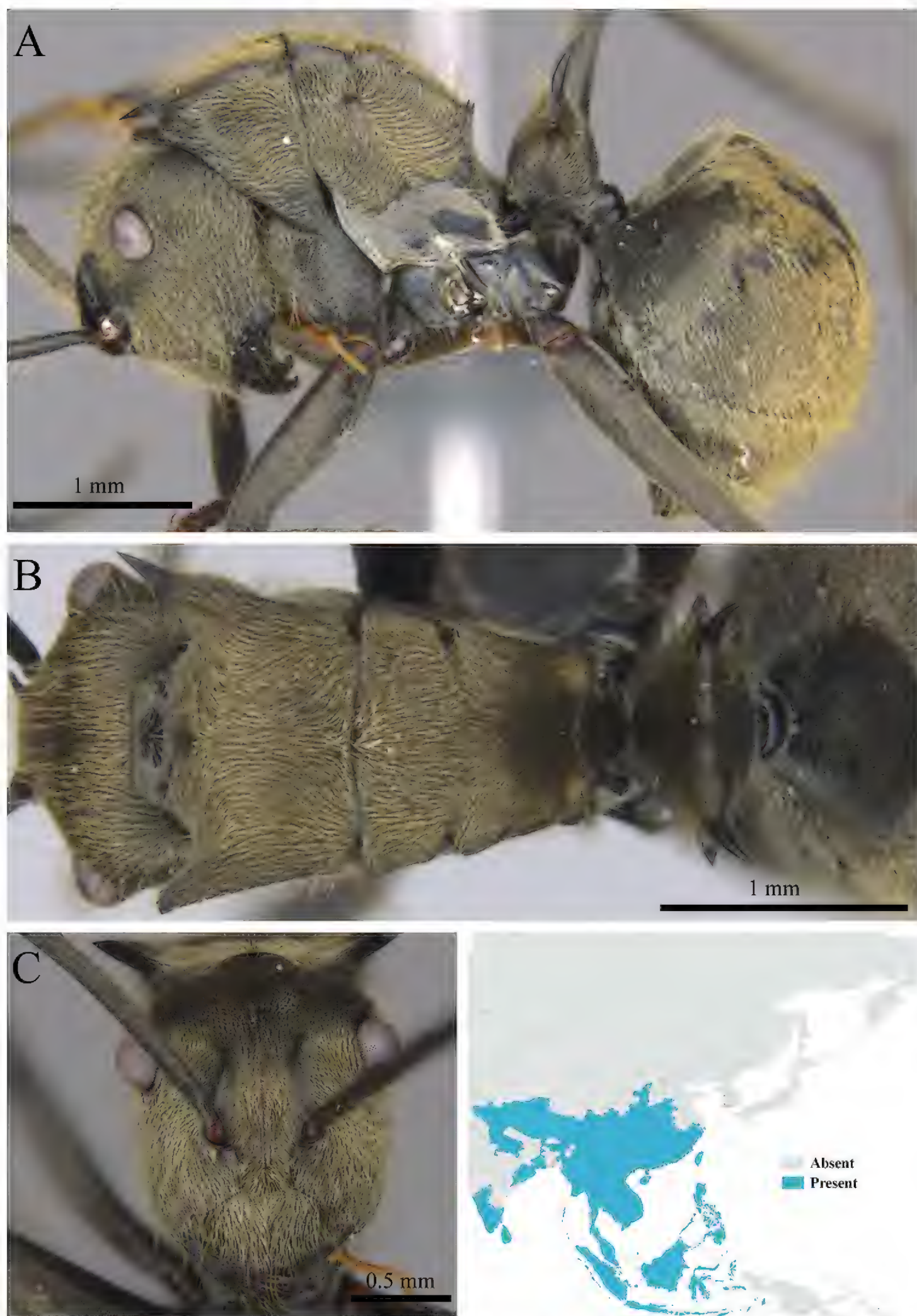
Polyrhachis furcata

Figure 45. *Polyrhachis furcata* worker (MCZ-ENT00763549) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



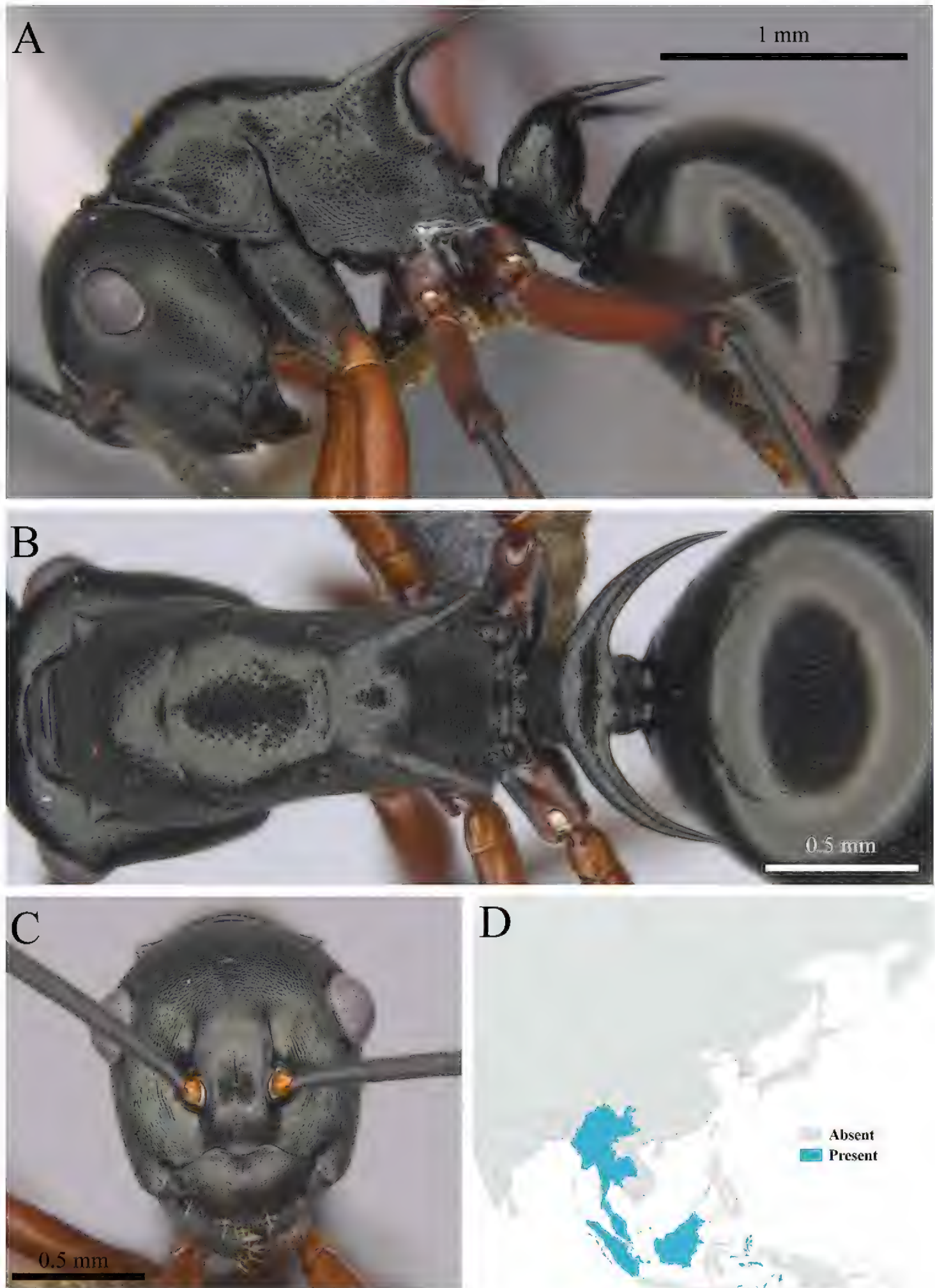
Polyrhachis halidayi

Figure 46. *Polyrhachis halidayi* worker (MCZ-ENT00763195) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



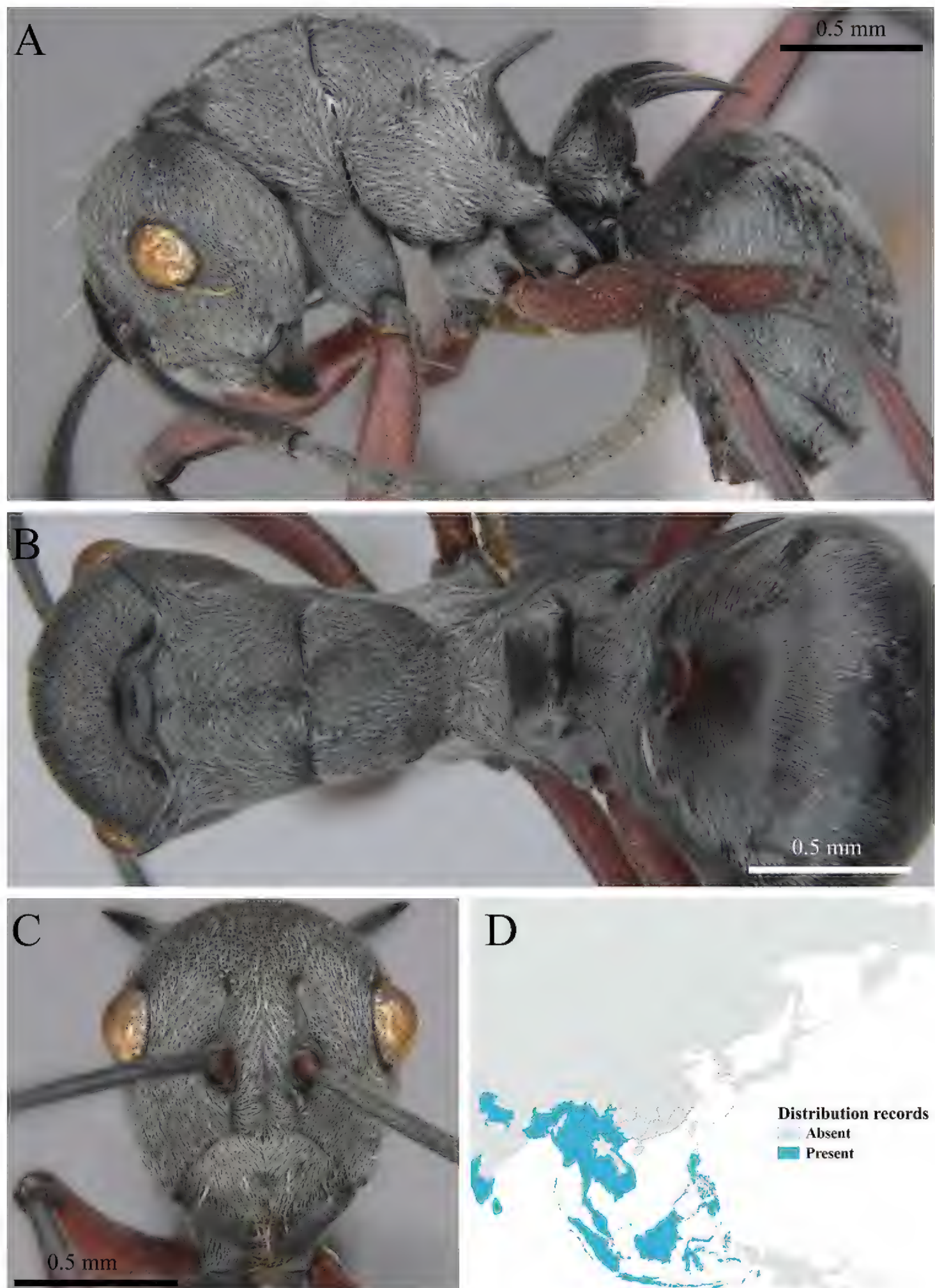
Polyrhachis illaudata

Figure 47. *Polyrhachis illaudata* worker (MCZ-ENT00760071) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



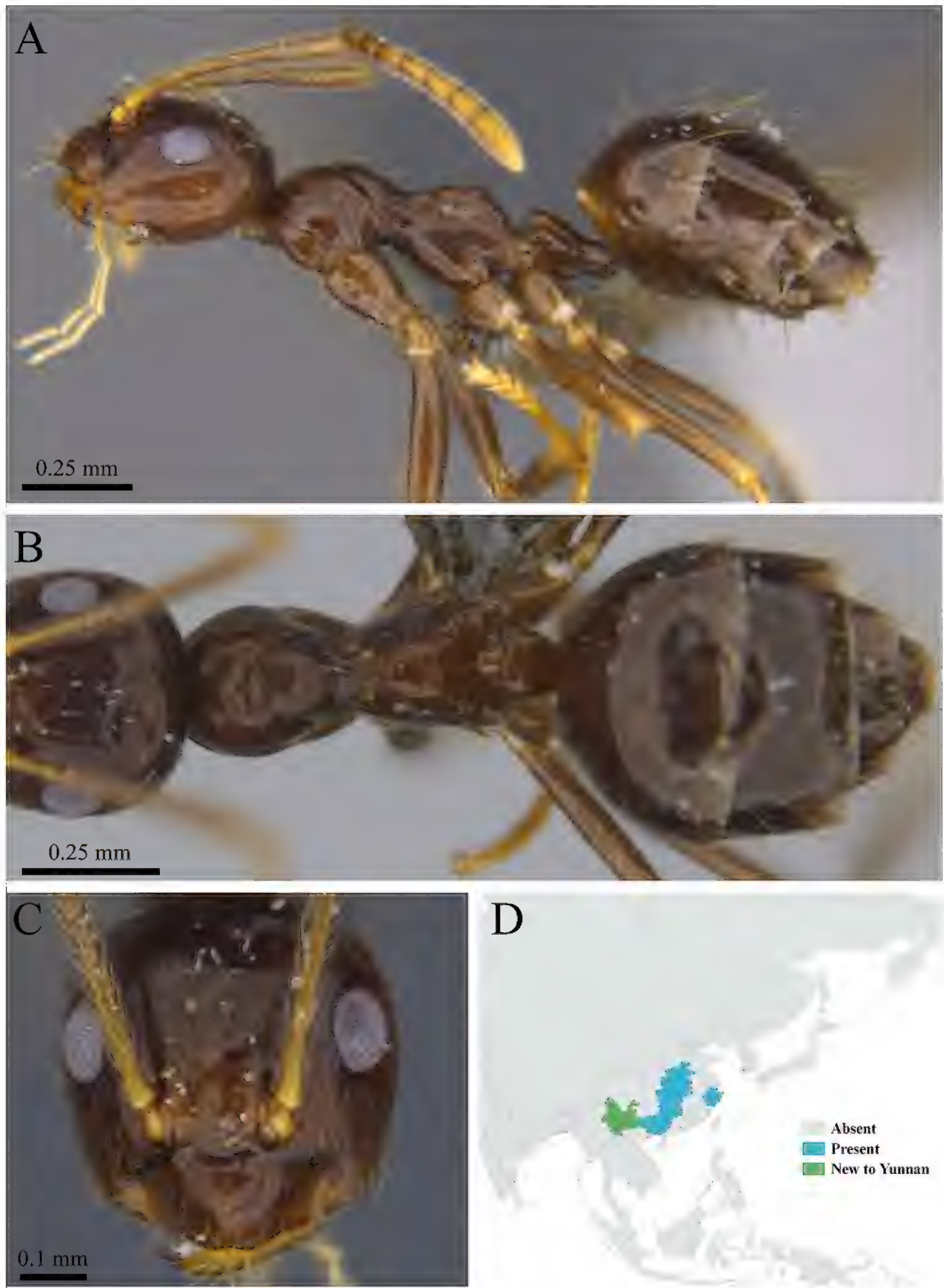
Polyrhachis laevigata

Figure 48. *Polyrhachis laevigata* worker (MCZ-ENT00763568) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



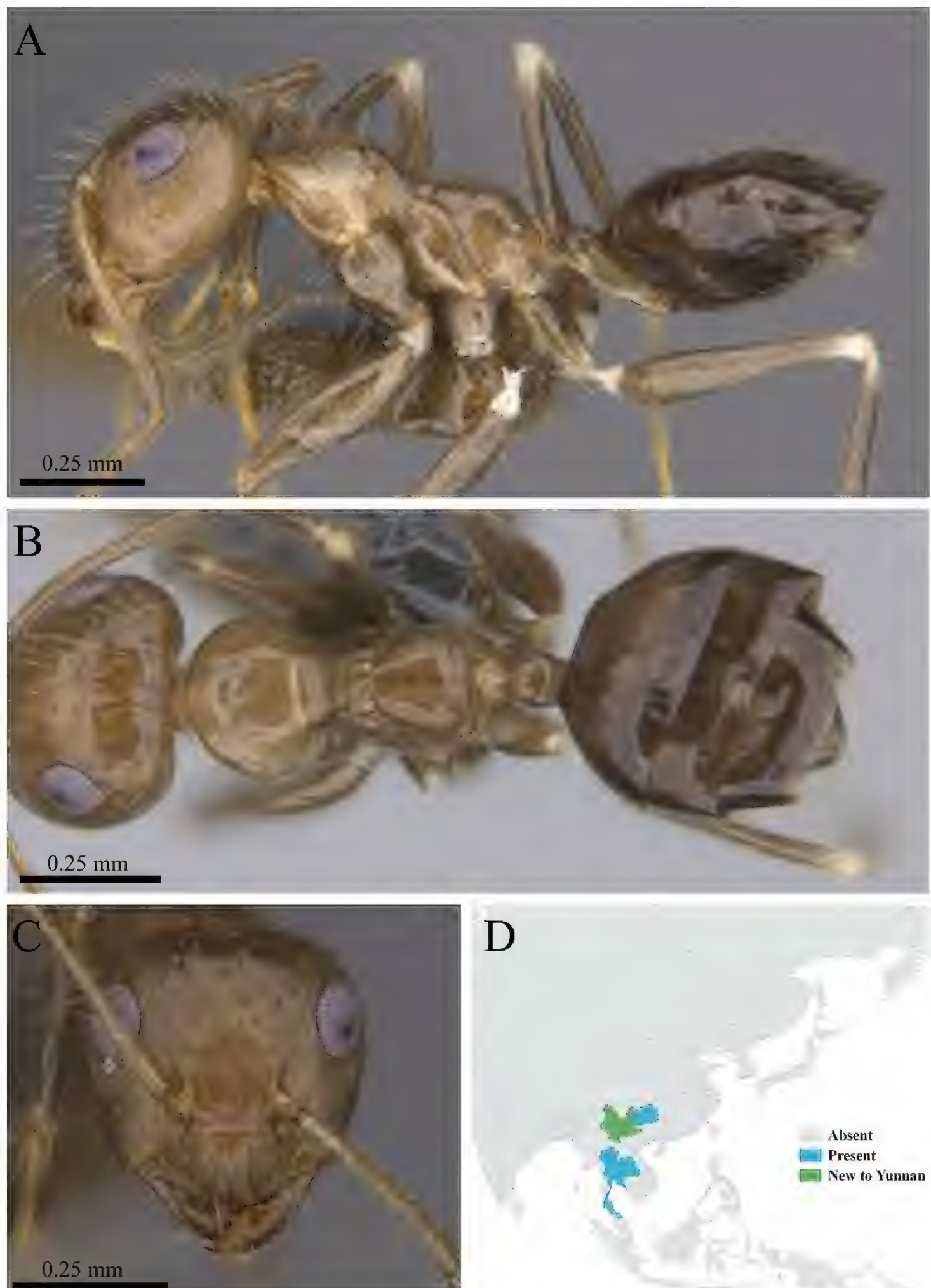
Polyrhachis tibialis

Figure 49. *Polyrhachis tibialis* worker (MCZ-ENT00763284). **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



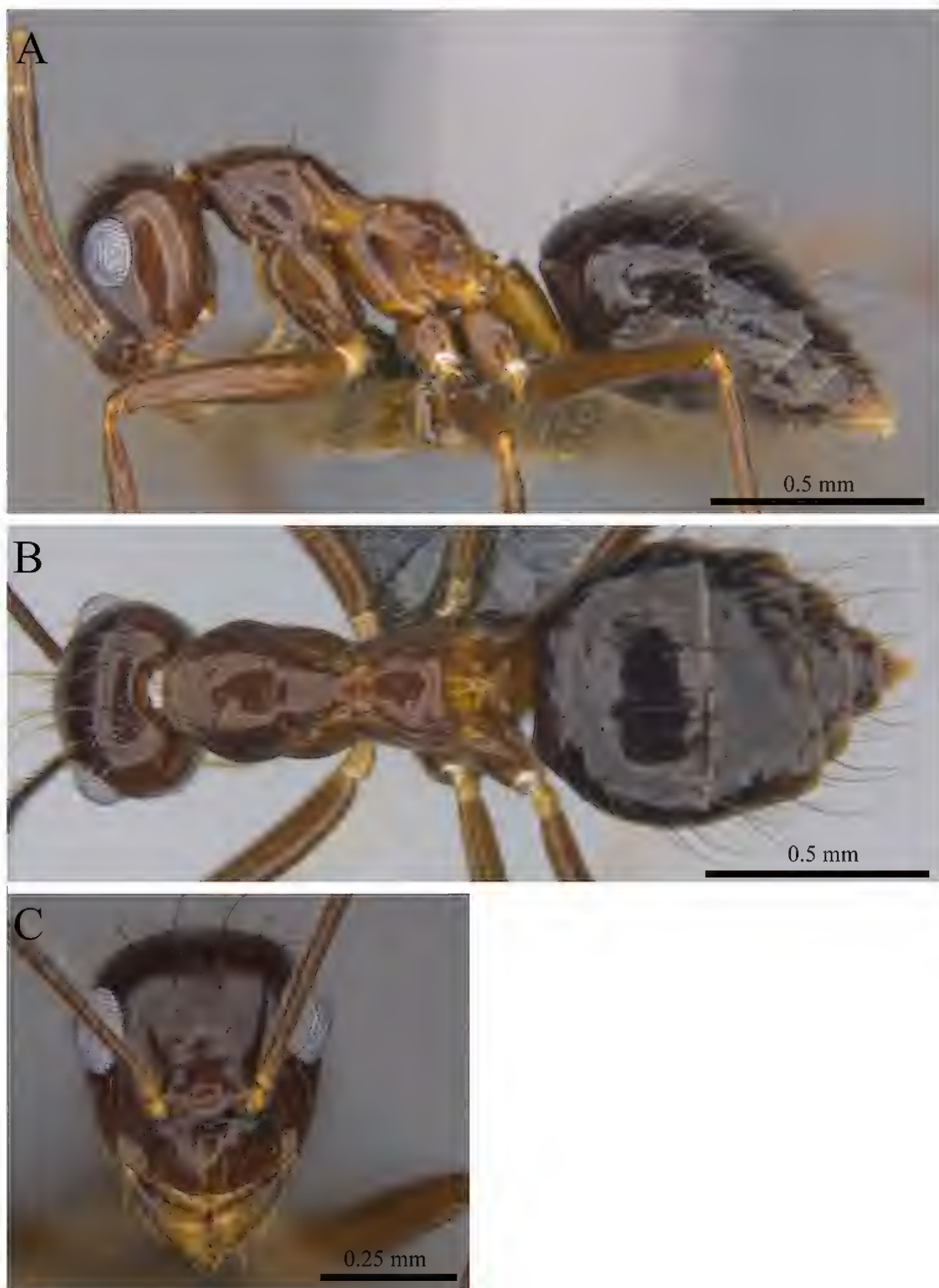
Prenolepis angularis

Figure 50. *Prenolepis angularis* worker (MCZ-ENT00763328, new to Yunnan). **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



Prenolepis fustinoda

Figure 51. *Prenolepis fustinoda* worker (MCZ-ENT00763200, new to Yunnan) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



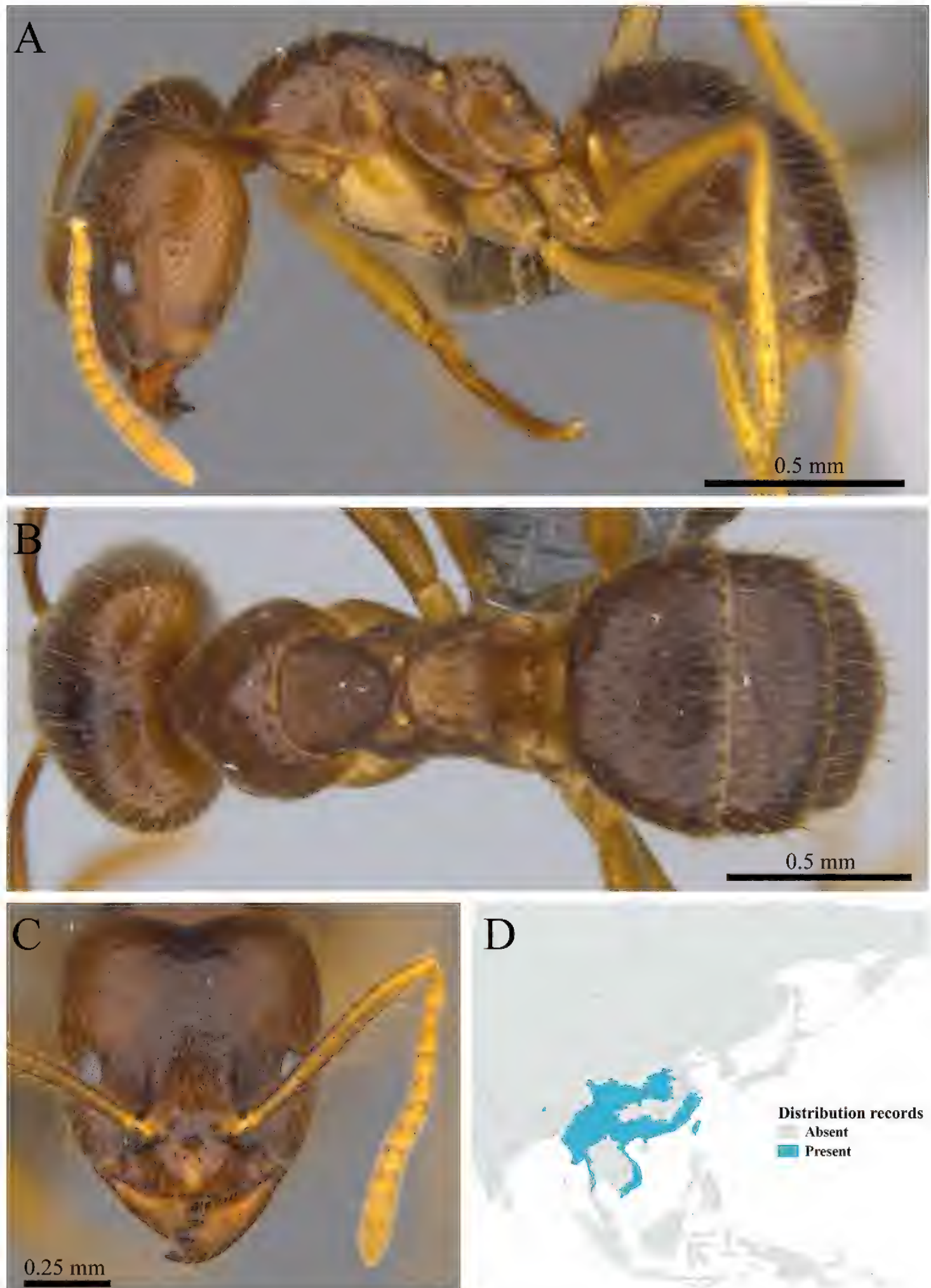
Prenolepis sp1

Figure 52. *Prenolepis* sp. clm01 worker (MCZ-ENT00763220) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



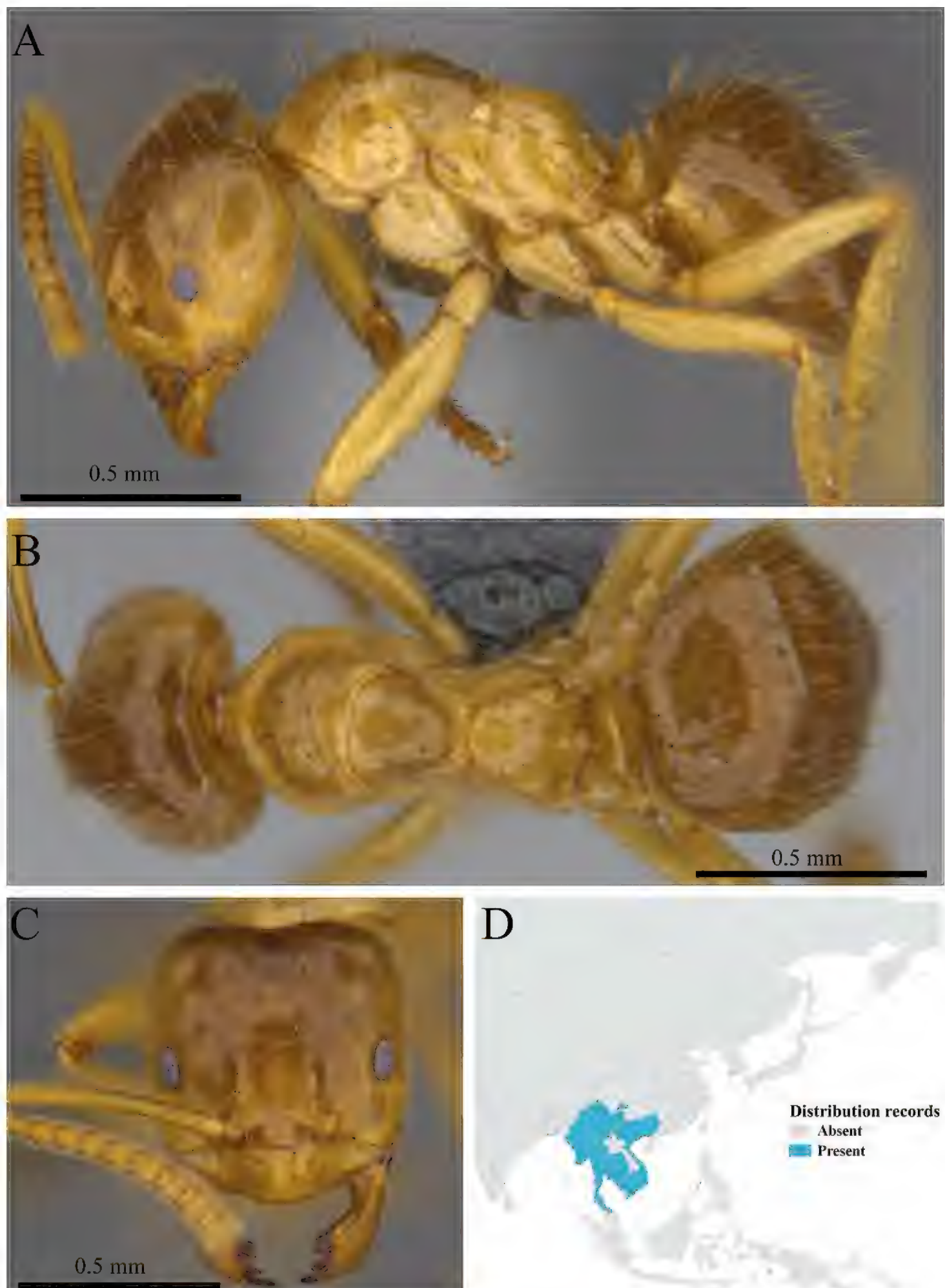
Prenolepis sp2

Figure 53. *Prenolepis* sp. clm02 worker (MCZ-ENT00763467) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



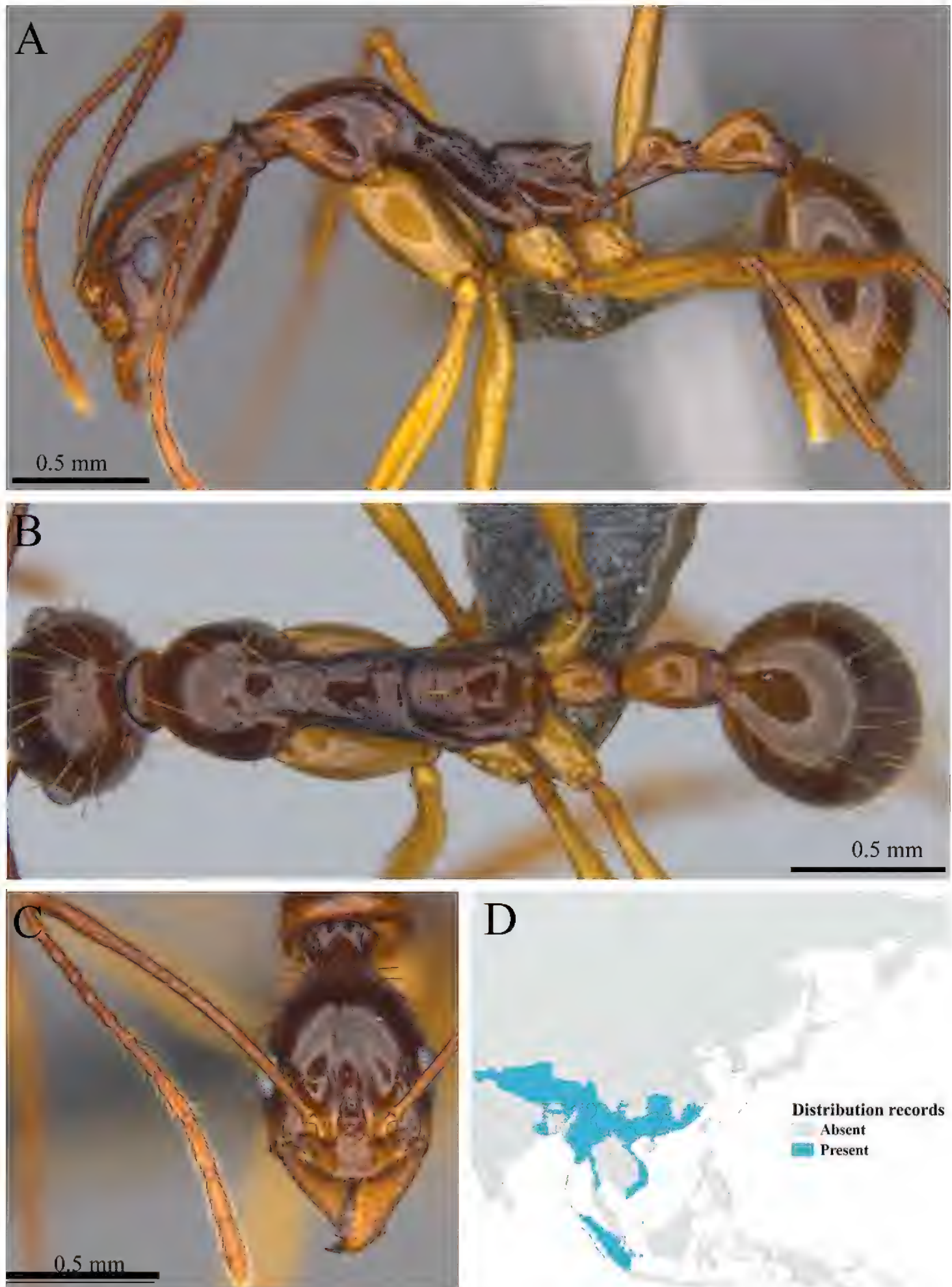
Pseudolasius emeryi

Figure 54. *Pseudolasius emeryi* worker (MCZ-ENT00762951) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



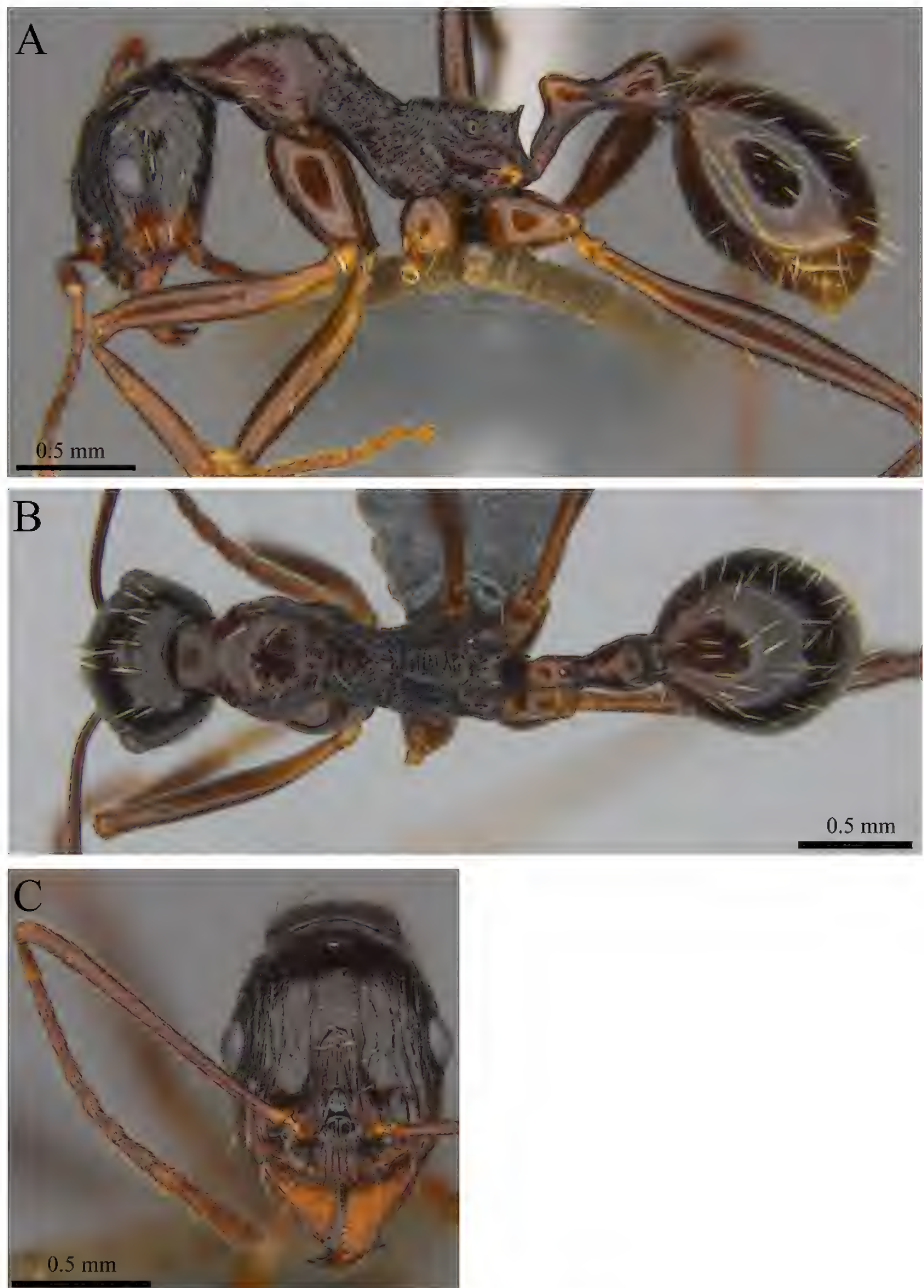
Pseudolasius silvestrii

Figure 55. *Pseudolasius silvestrii* worker (MCZ-ENT00762838) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



Aphenogaster feae

Figure 56. *Aphaenogaster feae* worker (MCZ-ENT00763554) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map..



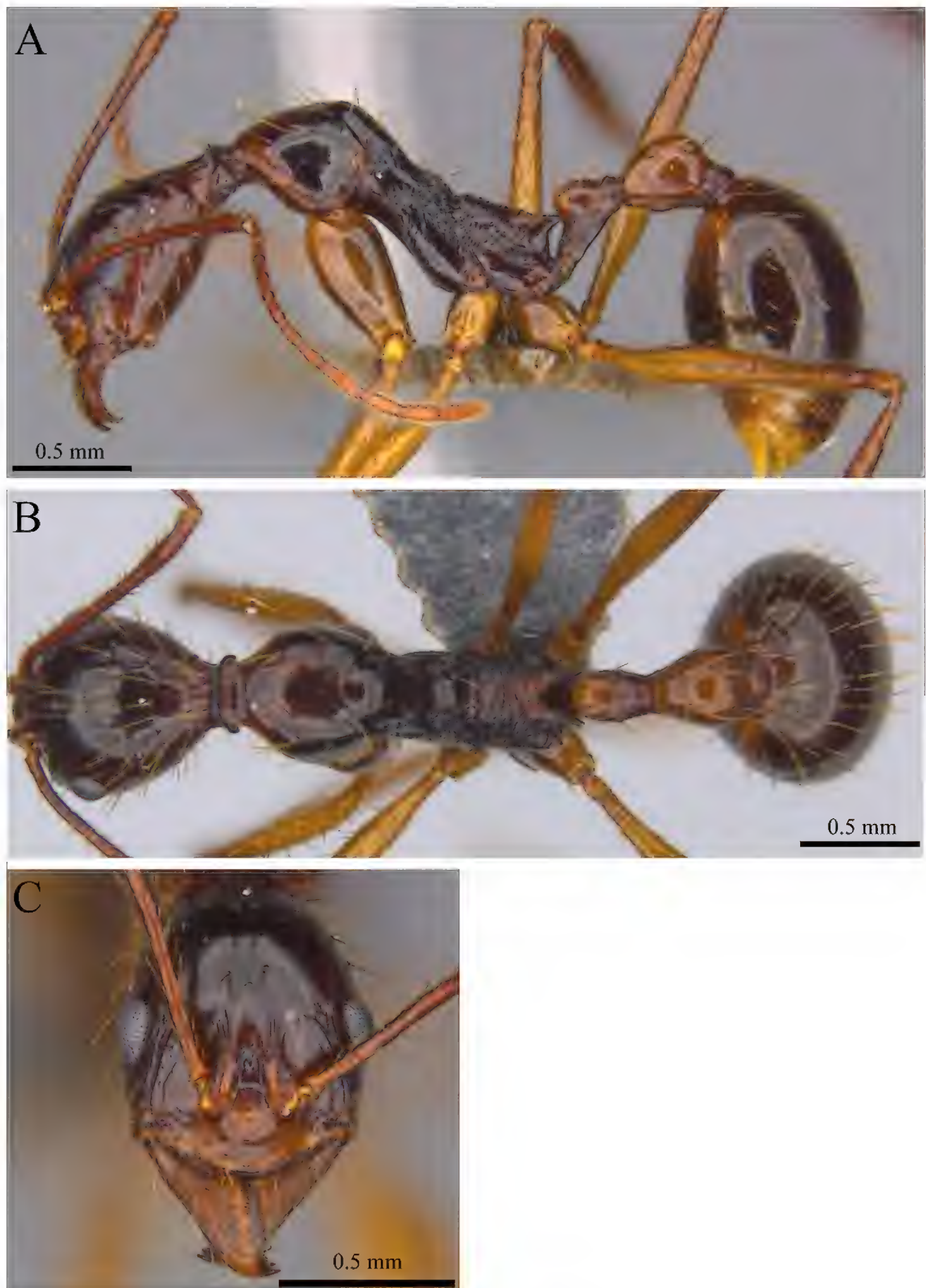
Aphenogaster sp1

Figure 57. *Aphaenogaster* sp. clm01 worker (MCZ-ENT00762870) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



Aphaenogaster sp2

Figure 58. *Aphaenogaster* sp. clm02 worker (MCZ-ENT00763366) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



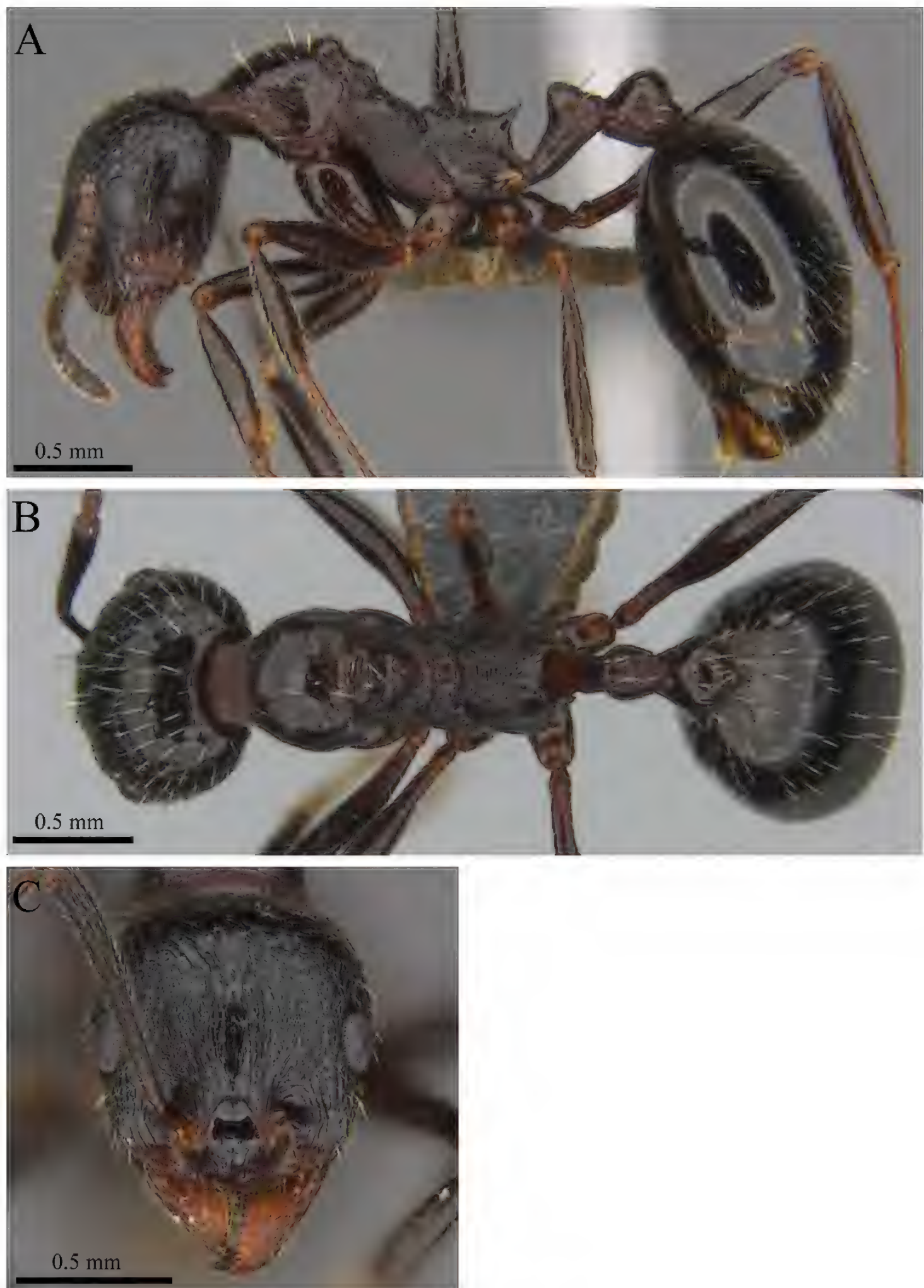
Aphaenogaster sp3

Figure 59. *Aphaenogaster* sp. clm03 worker (MCZ-ENT00763603) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



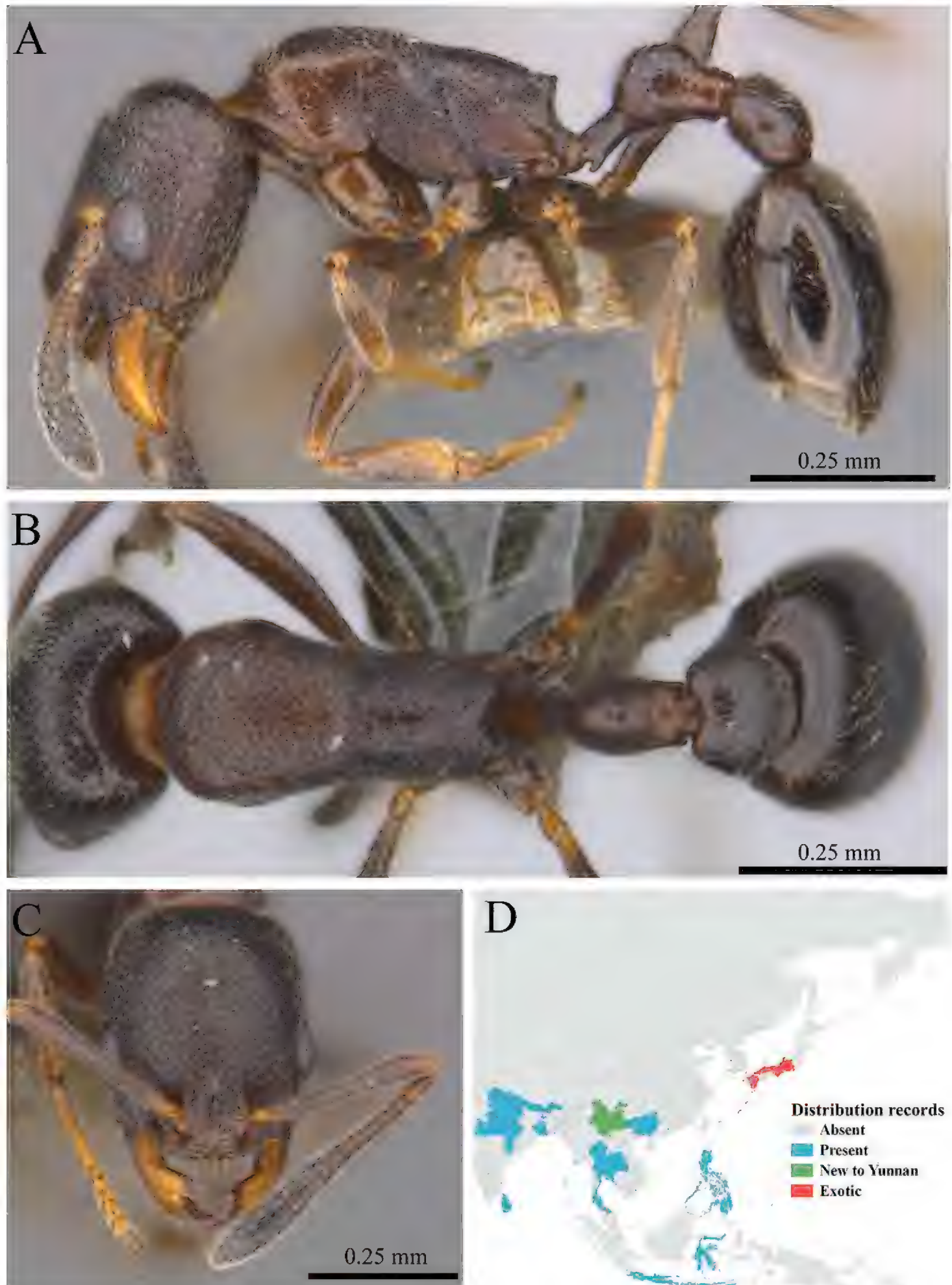
Aphaenogaster sp4

Figure 60. *Aphaenogaster* sp. clm04 worker (MCZ-ENT00764622) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



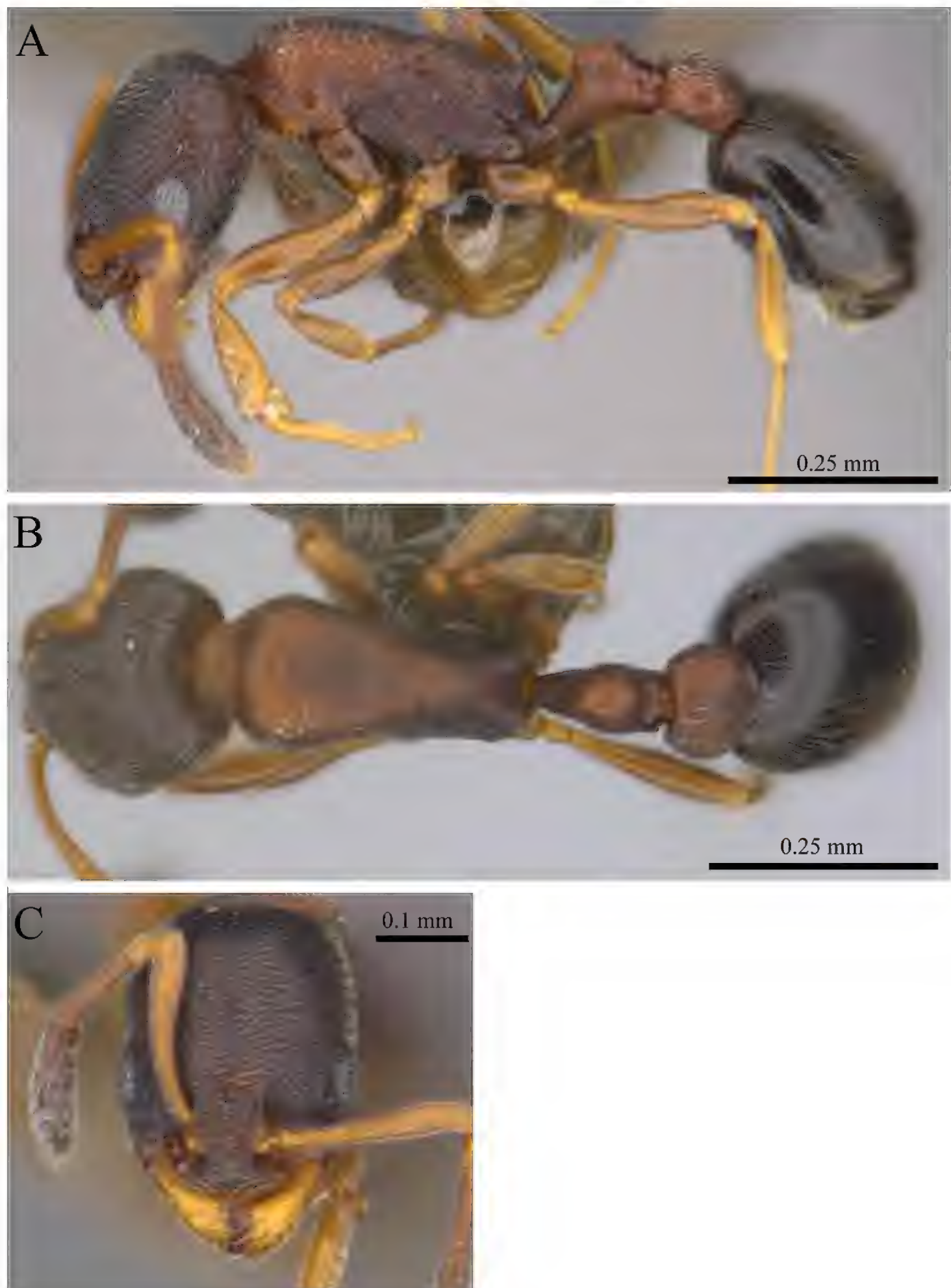
Aphaenogaster sp5

Figure 6I. *Aphaenogaster* sp. clm05 worker (MCZ-ENT00762809) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



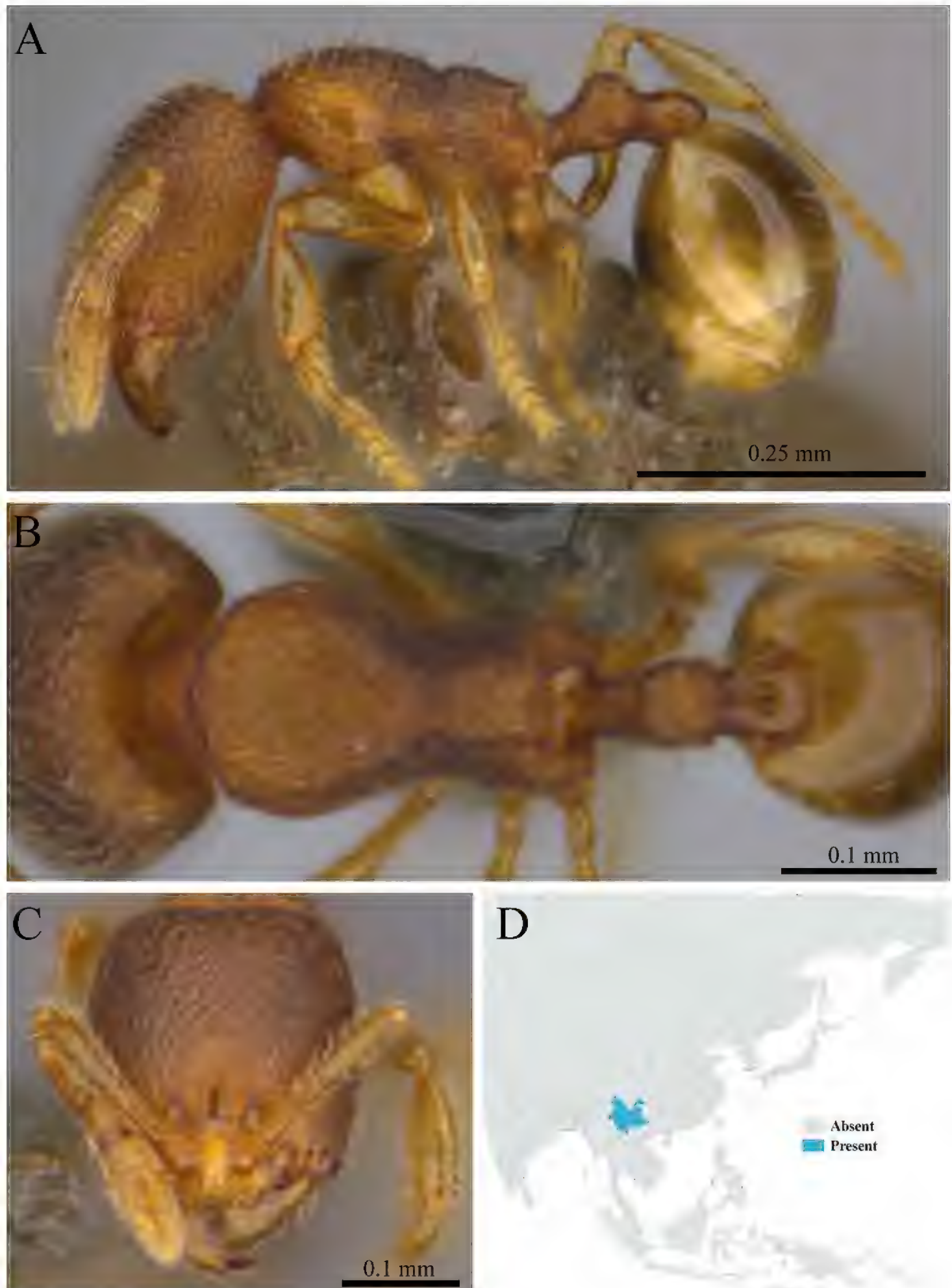
Cardiocondyla itsukii

Figure 62. *Cardiocondyla itsukii* worker (MCZ-ENT00762820, new to Yunnan) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



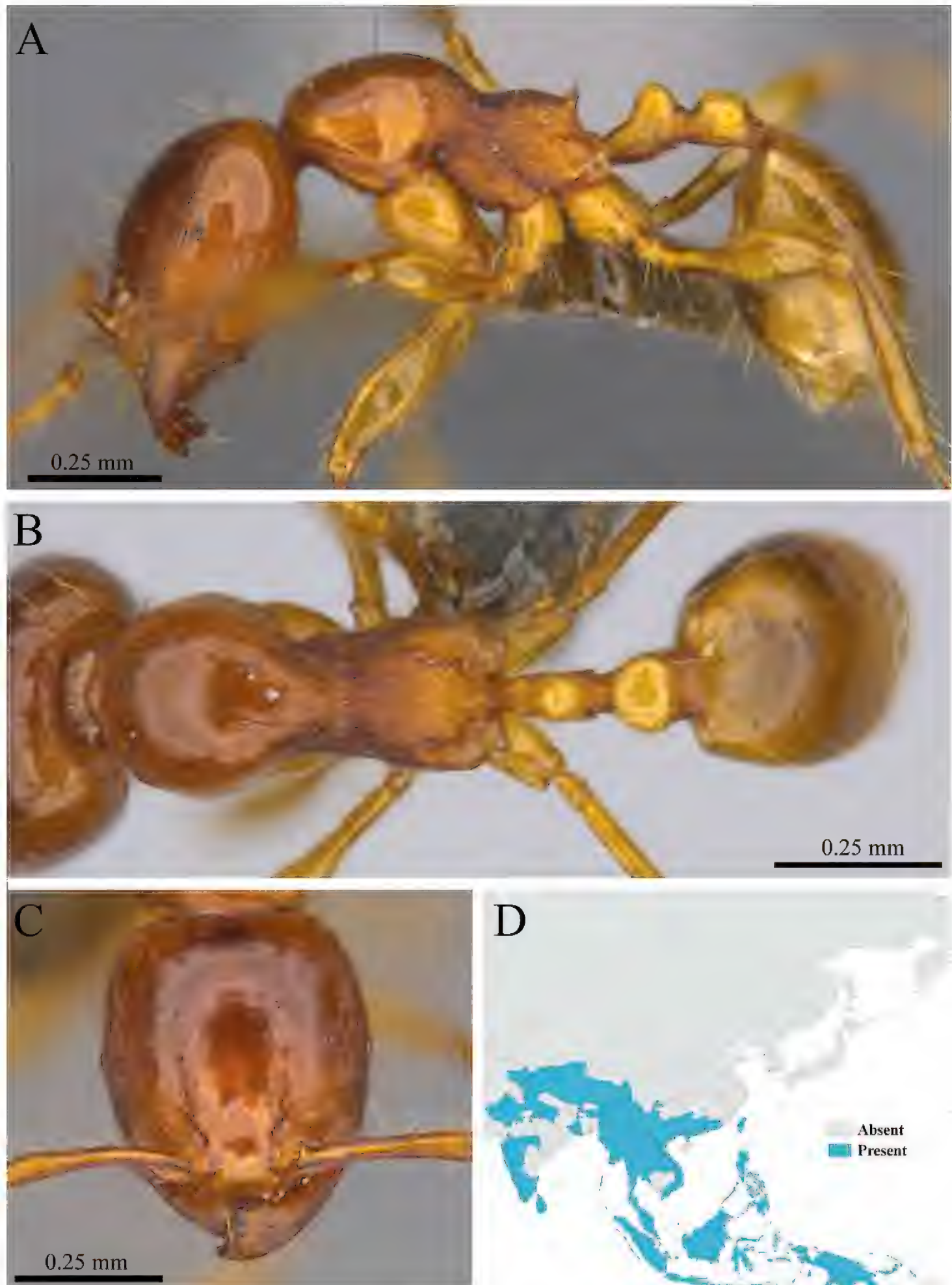
Cardiocondyla sp1

Figure 63. *Cardiocondyla* sp. clm01worker (MCZ-ENT00763607) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



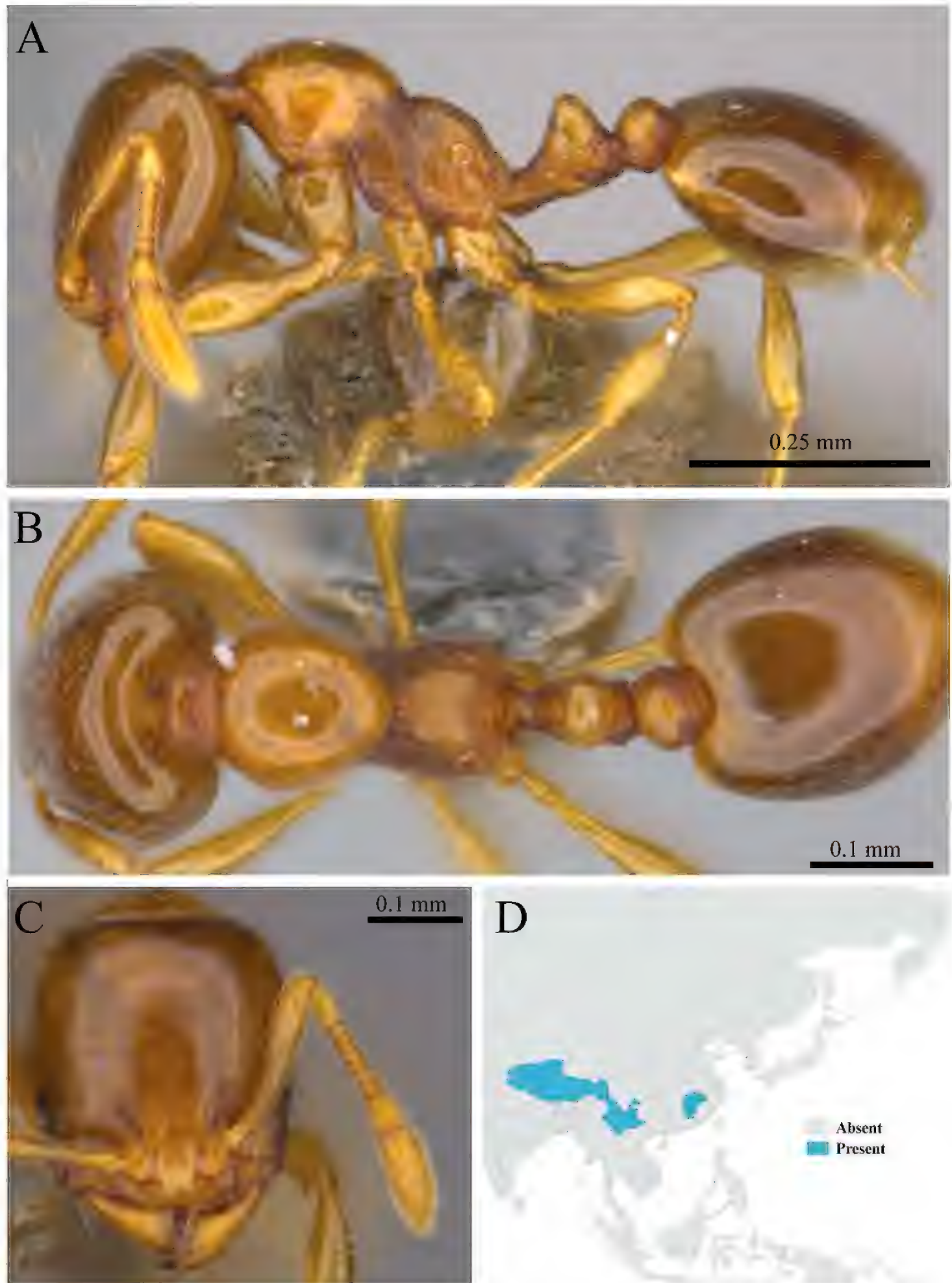
Carebara acutispina

Figure 64. *Carebara affinis* worker (MCZ-ENT00759841) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



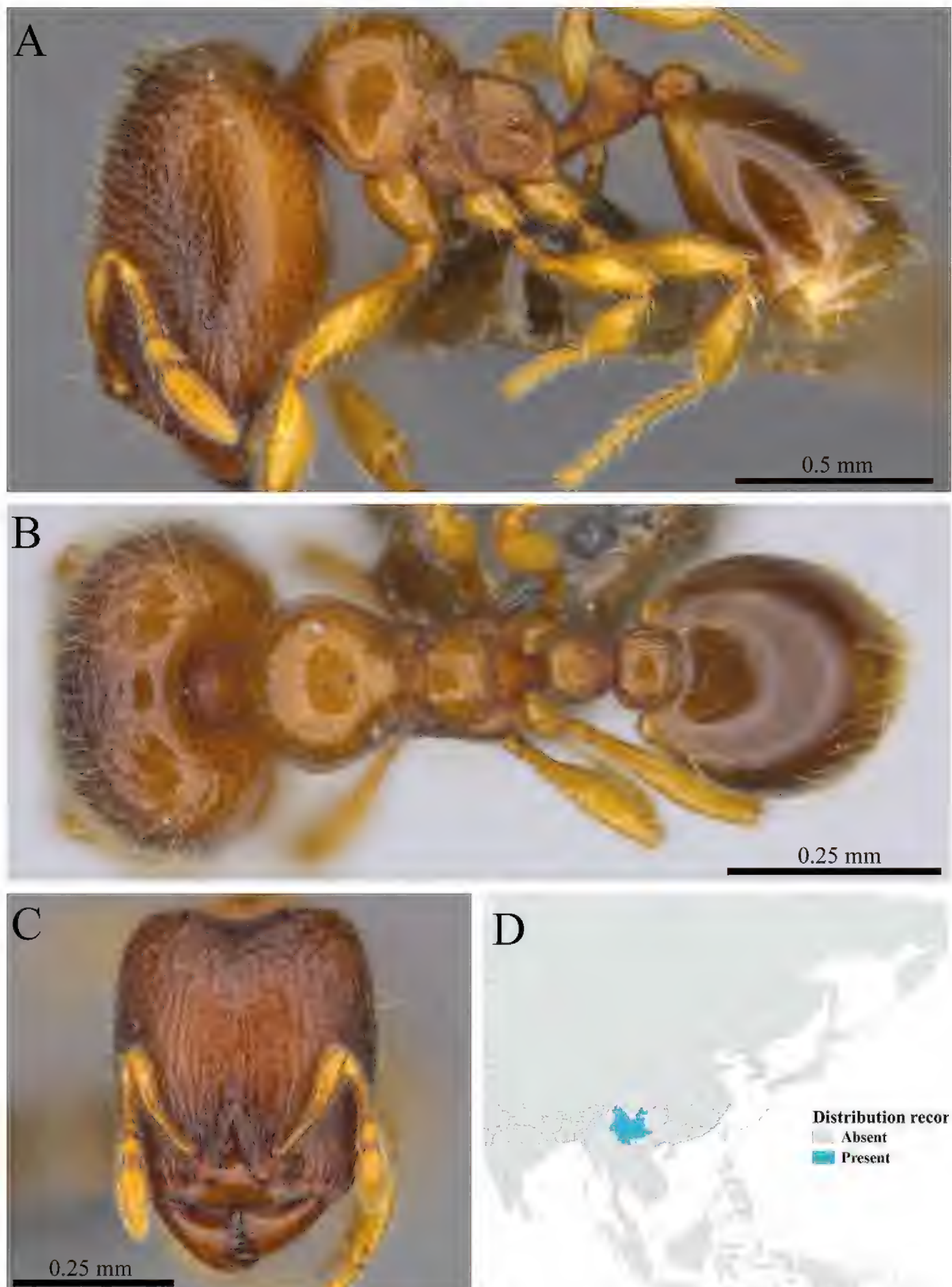
Carebara affinis

Figure 65. *Carebara acutispina* worker (MCZ-ENT00759773) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



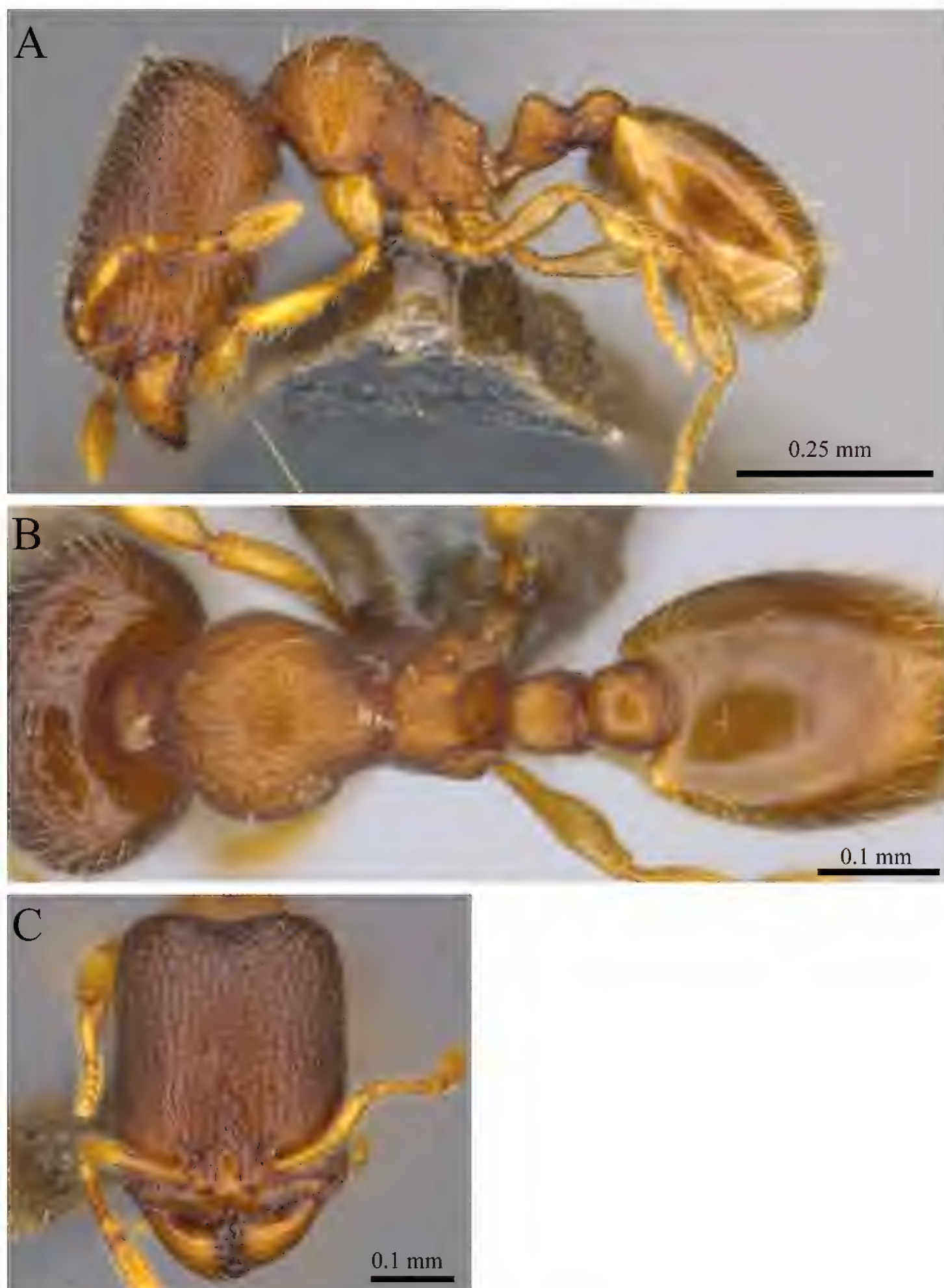
Carebara altinoda

Figure 66. *Carebara altinoda* worker (MCZ-ENT00759928) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



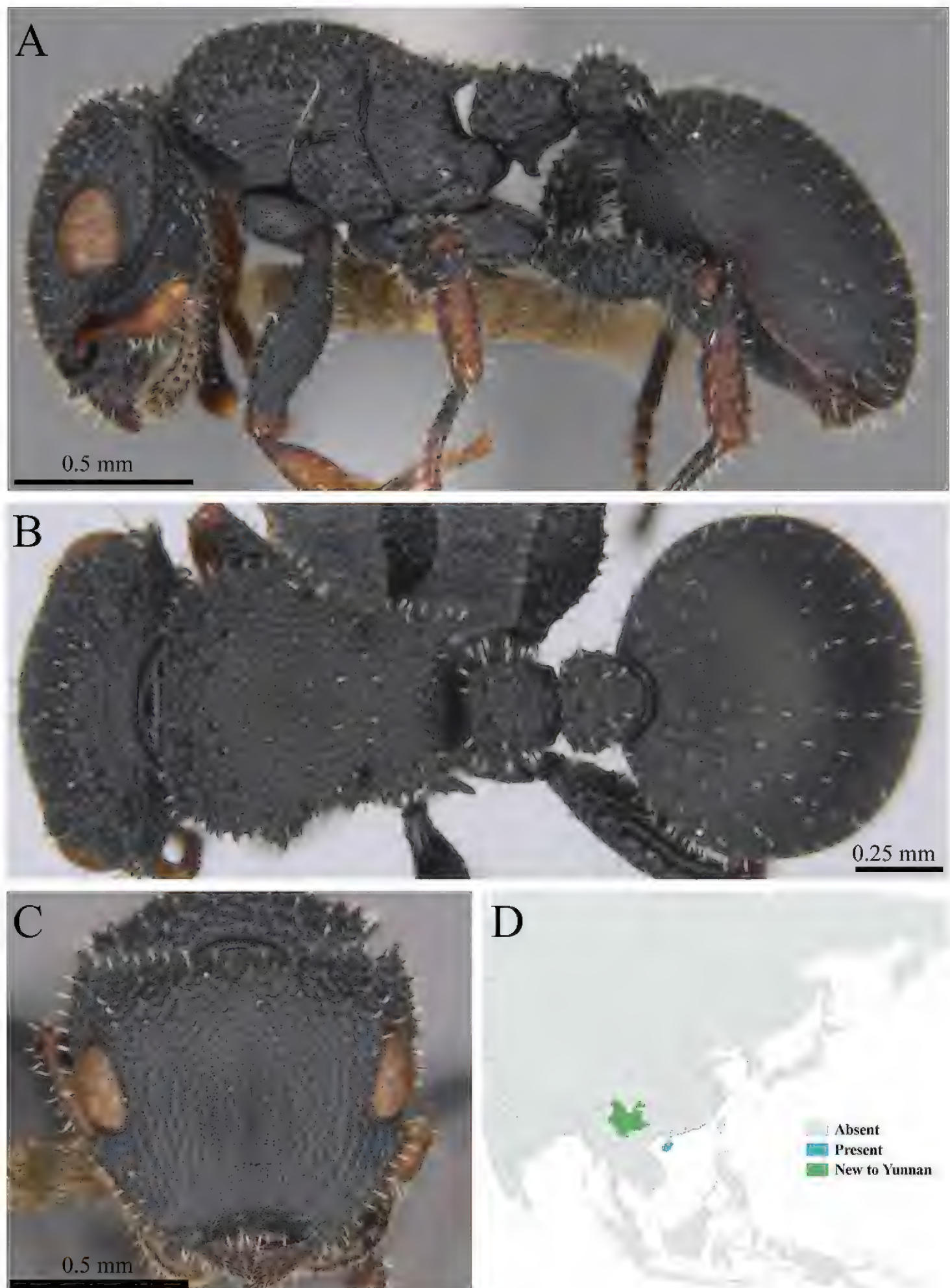
Caerbara bihornata

Figure 67. *Carebara bihornata* worker (MCZ-ENT00759796) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



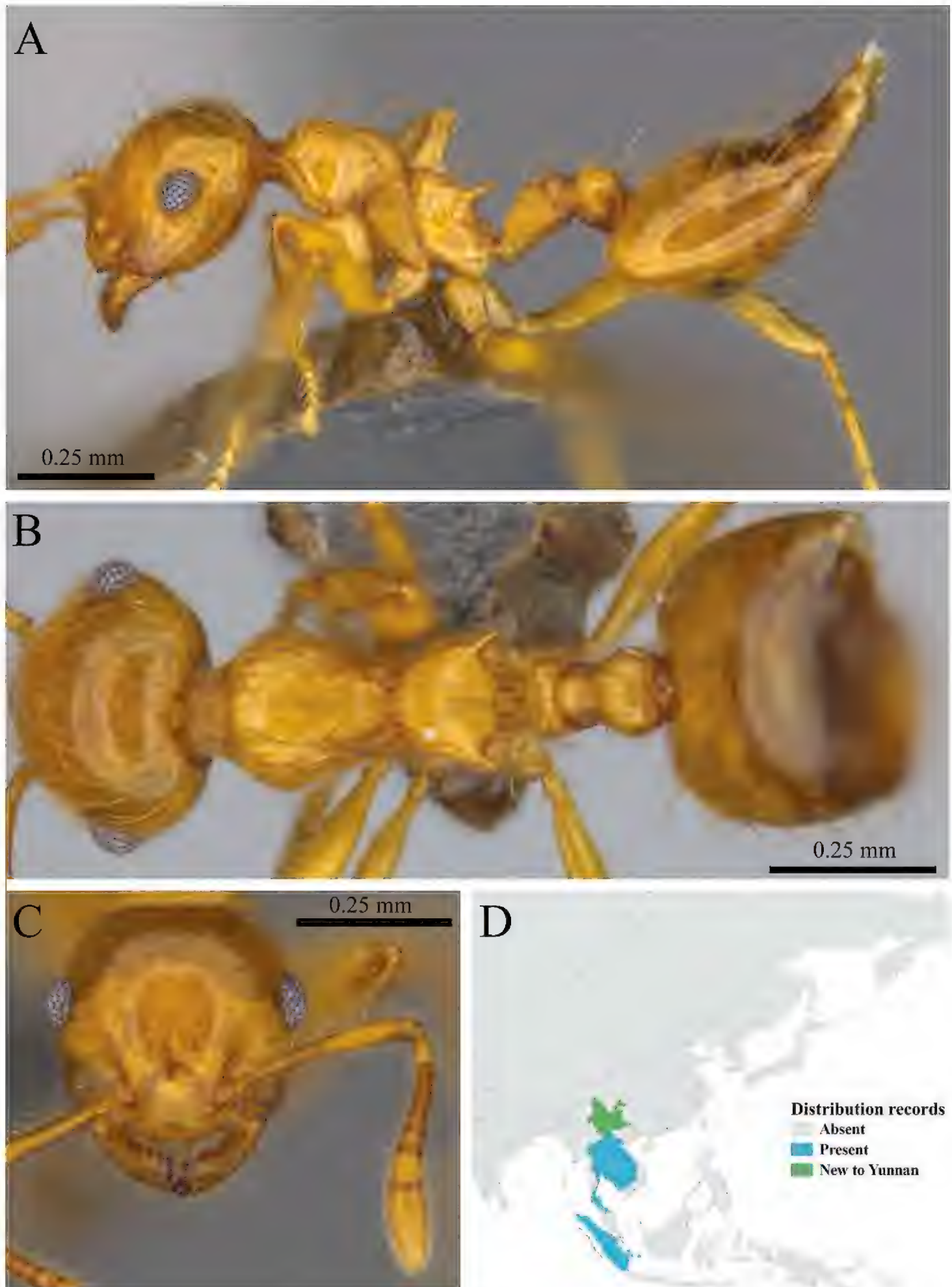
Carebara sp1

Figure 68. *Carebara* sp. clm01 worker (MCZ-ENT00759855) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



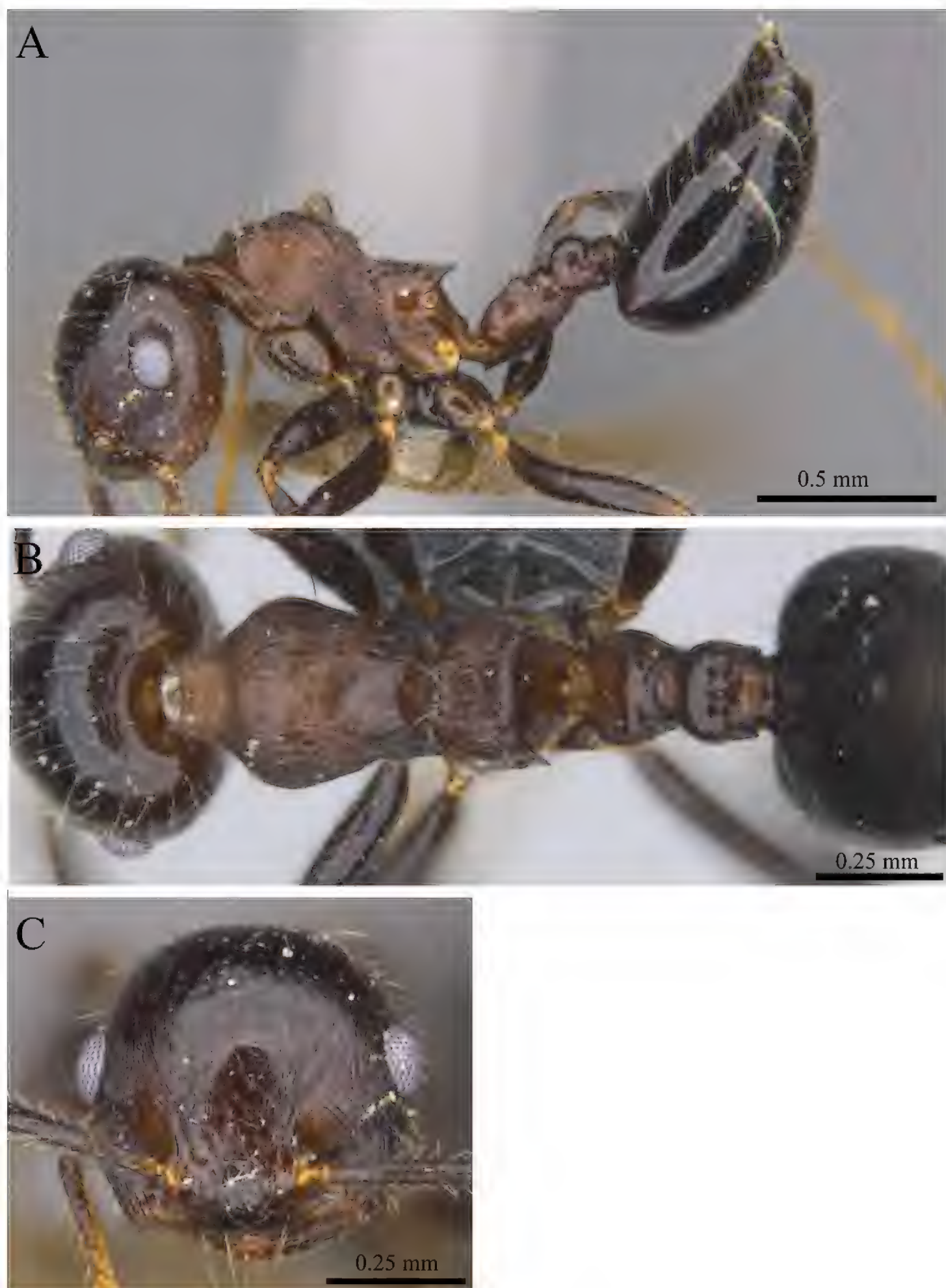
Cataulacus marginatus

Figure 69. *Cataulacus marginatus* worker (MCZ-ENT00760045, new to Yunnan) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



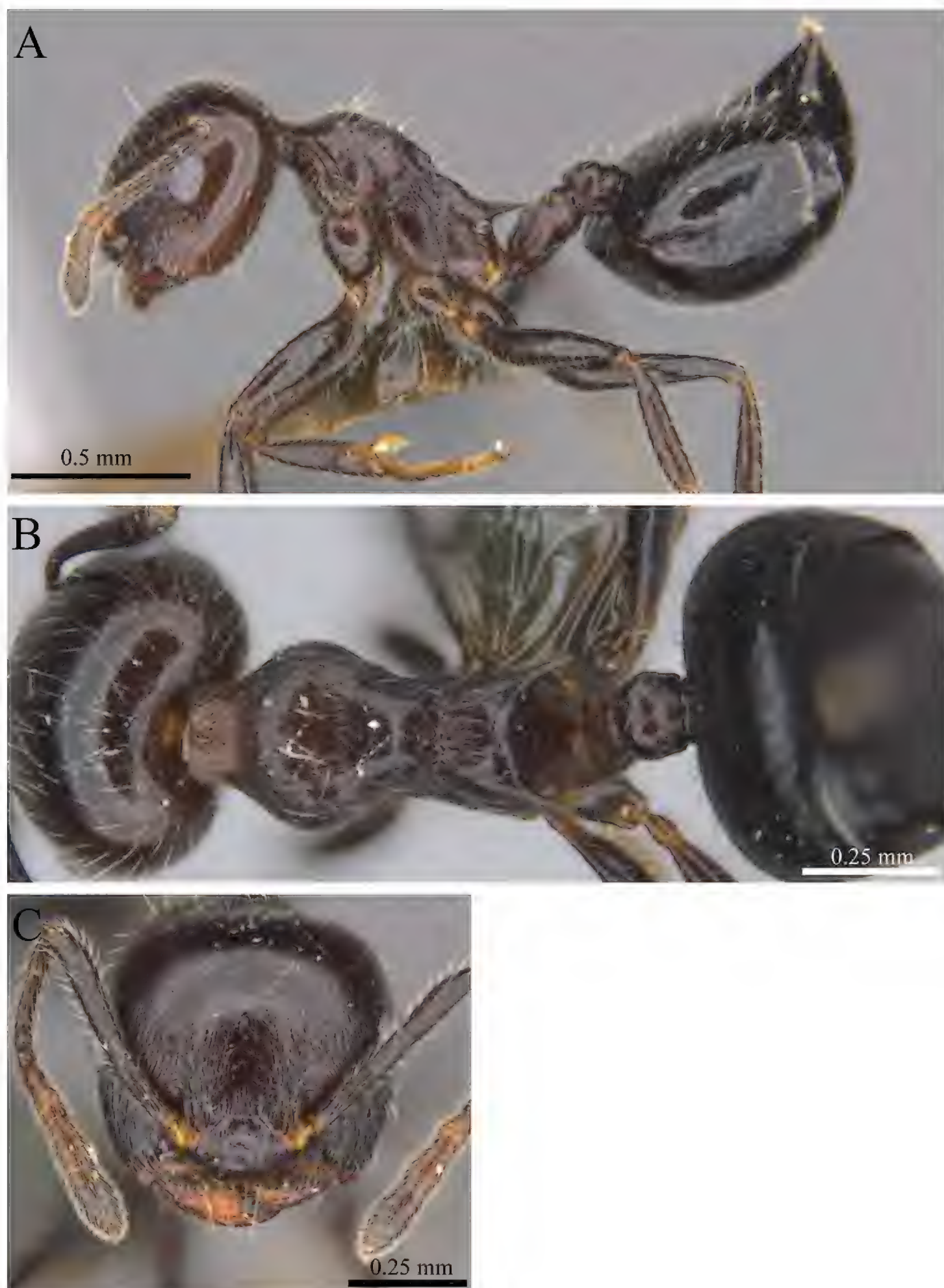
Crematogaster quadriruga

Figure 70. *Crematogaster quadriruga* worker (MCZ-ENT00759778) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



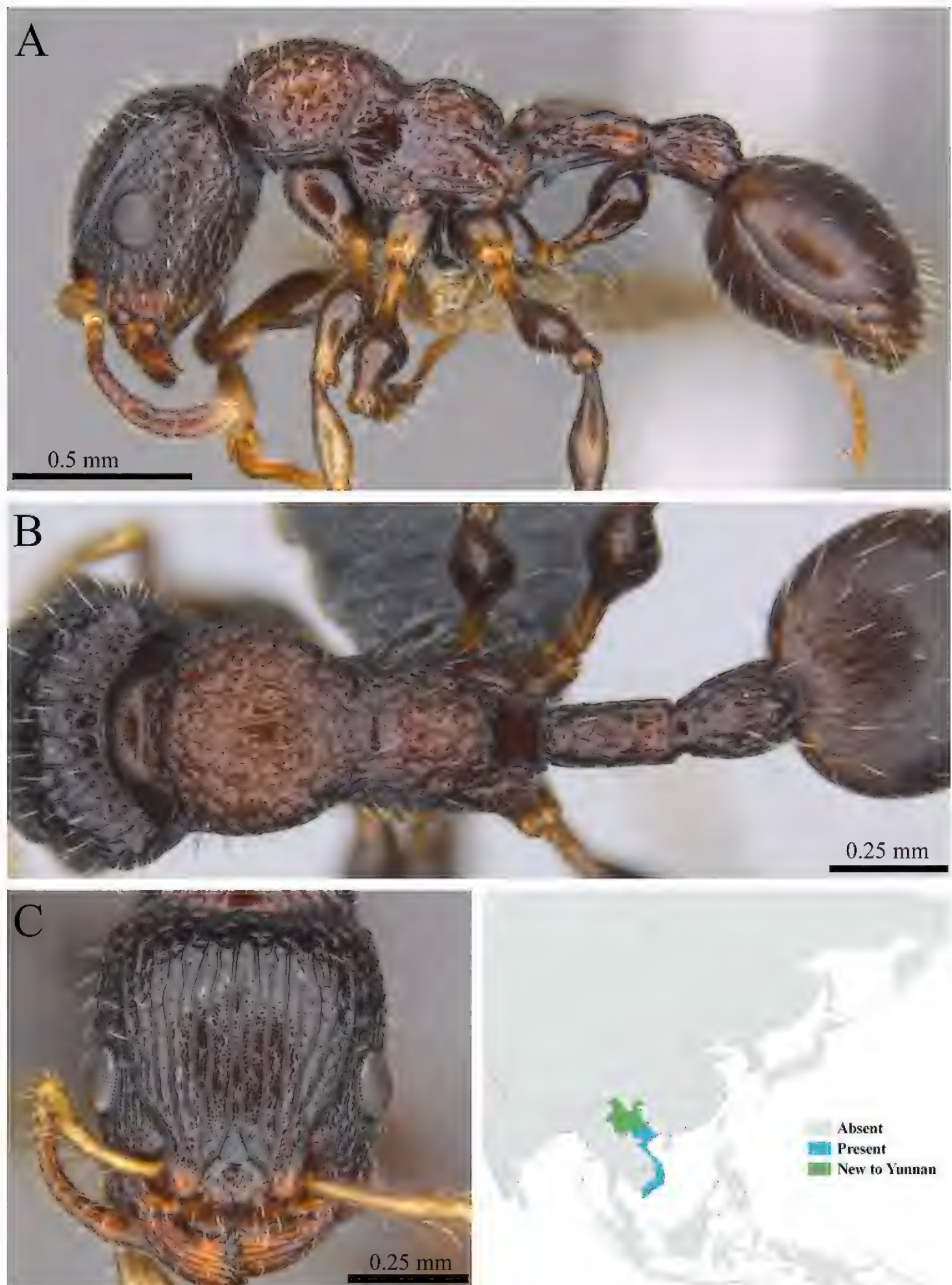
Crematogaster sp1

Figure 71. *Crematogaster* sp. clm01 worker (MCZ-ENT00762837) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



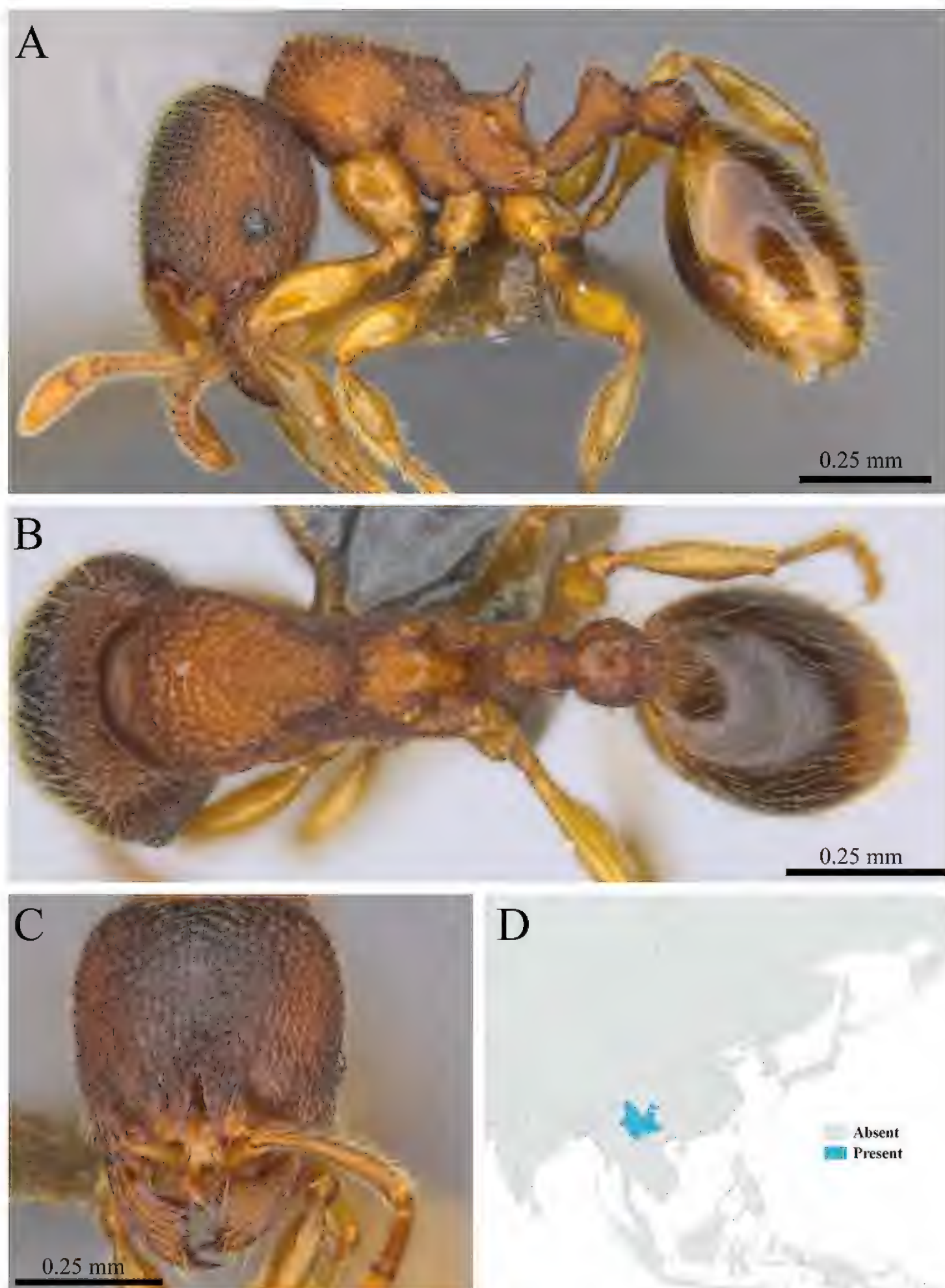
Crematogaster sp2

Figure 72. *Crematogaster* sp. clm02 worker (MCZ-ENT00762875) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



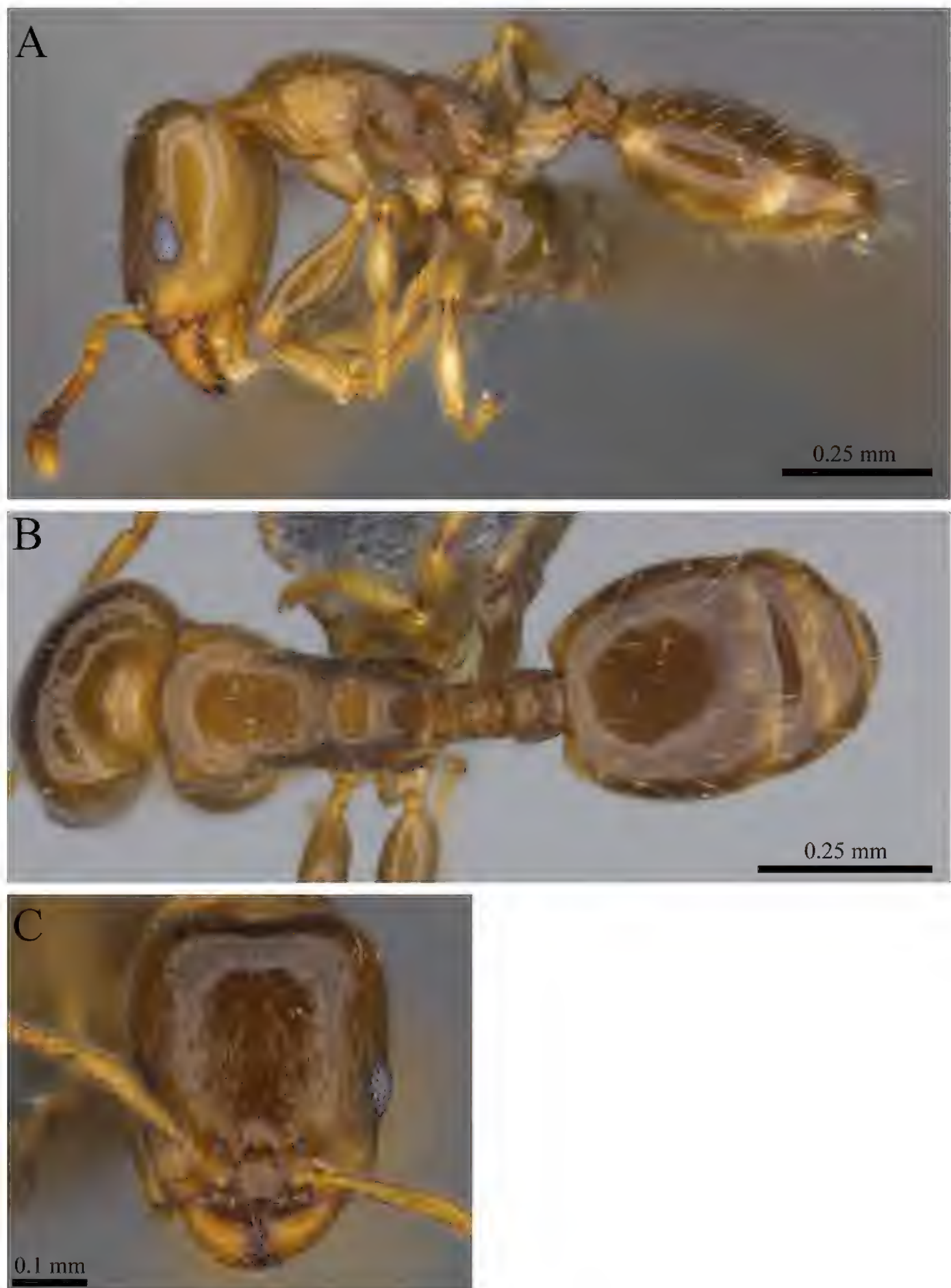
Dilobocondyla eguchii

Figure 73. *Dilobocondyla eguchii* worker (MCZ-ENT00763656, new to China) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



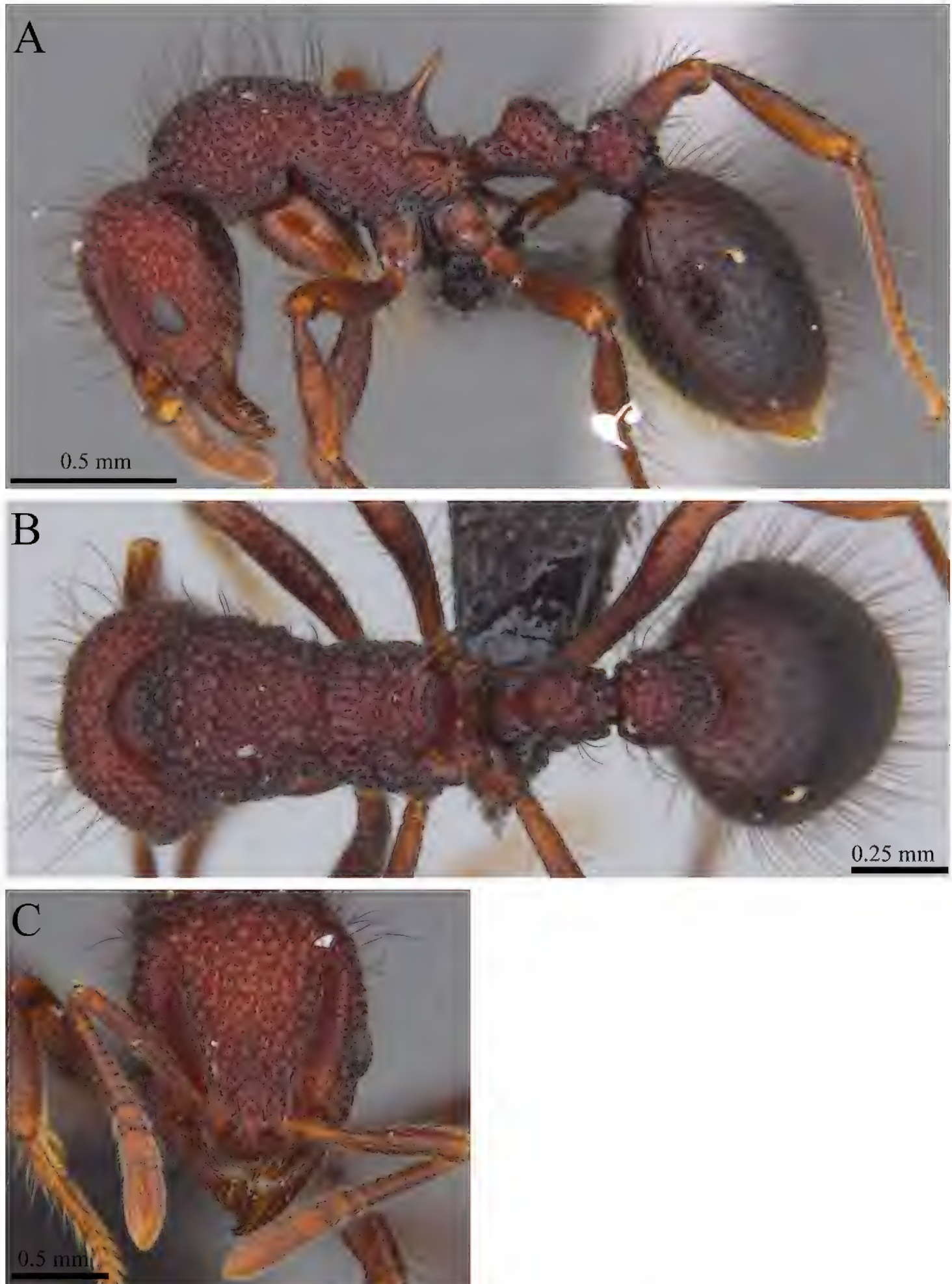
Gaoligongidris planodorsa

Figure 74. *Gaoligongidris planodorsa* worker (MCZ-ENT00759792) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



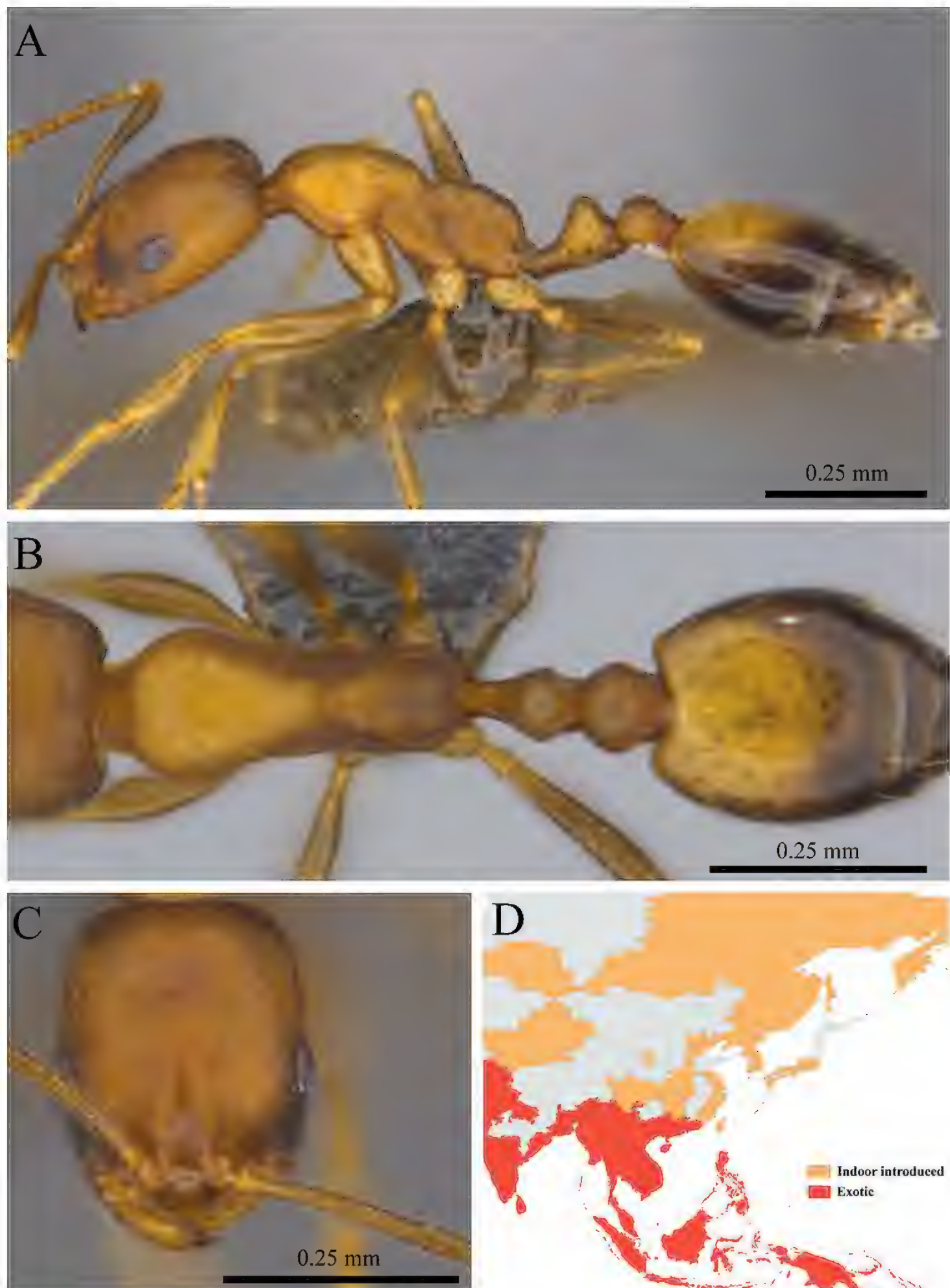
Grauromyrmex sp1

Figure 75. *Gauromyrmex* sp. clm01 worker (MCZ-ENT00764656) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



Lordomyrma sp1

Figure 76. *Lordomyrma* sp. clm01 worker (MCZ-ENT00763514) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



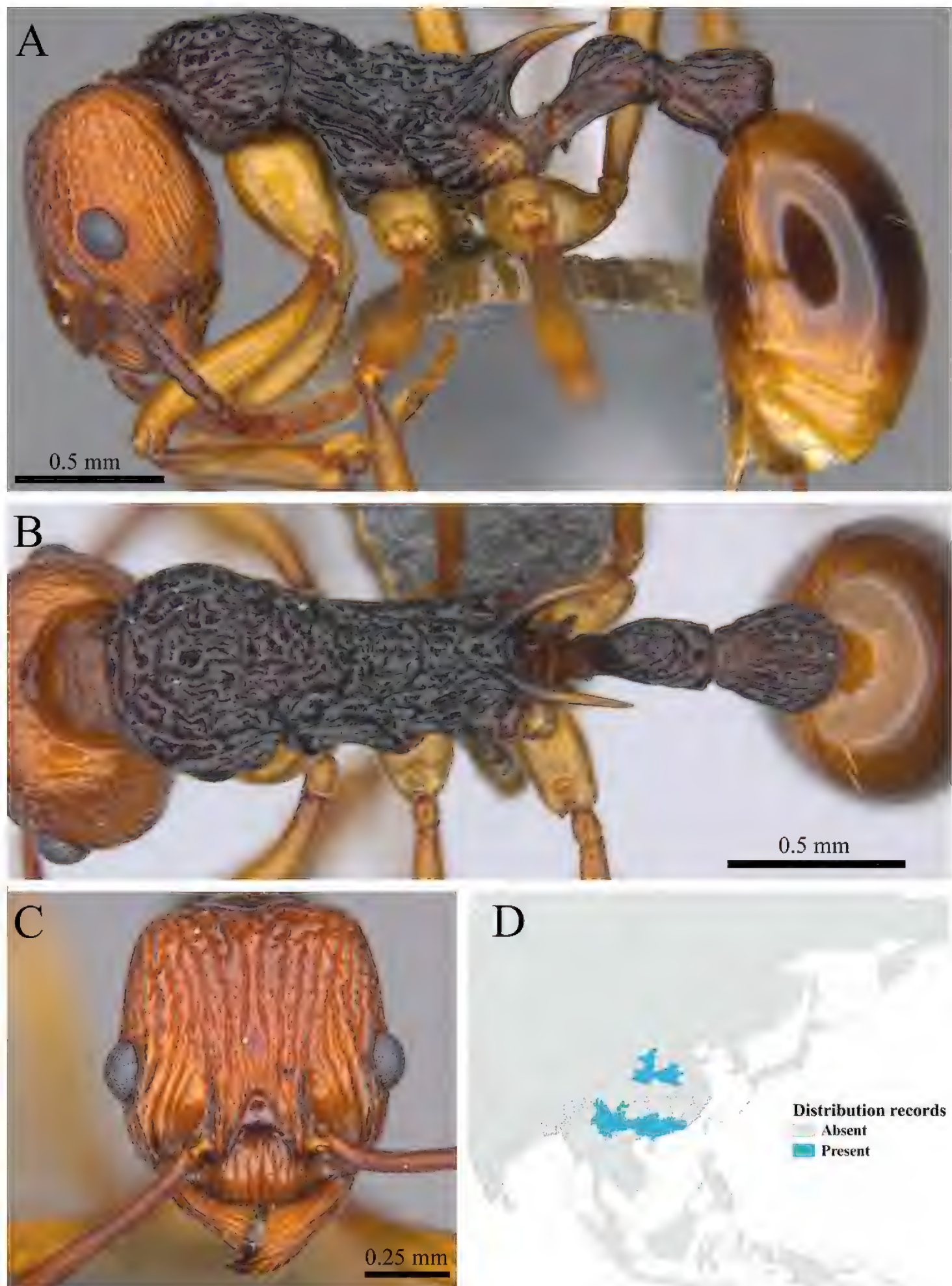
Monomorium pharaonis

Figure 77. *Monomorium pharaonis* worker (MCZ-ENT00760064) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



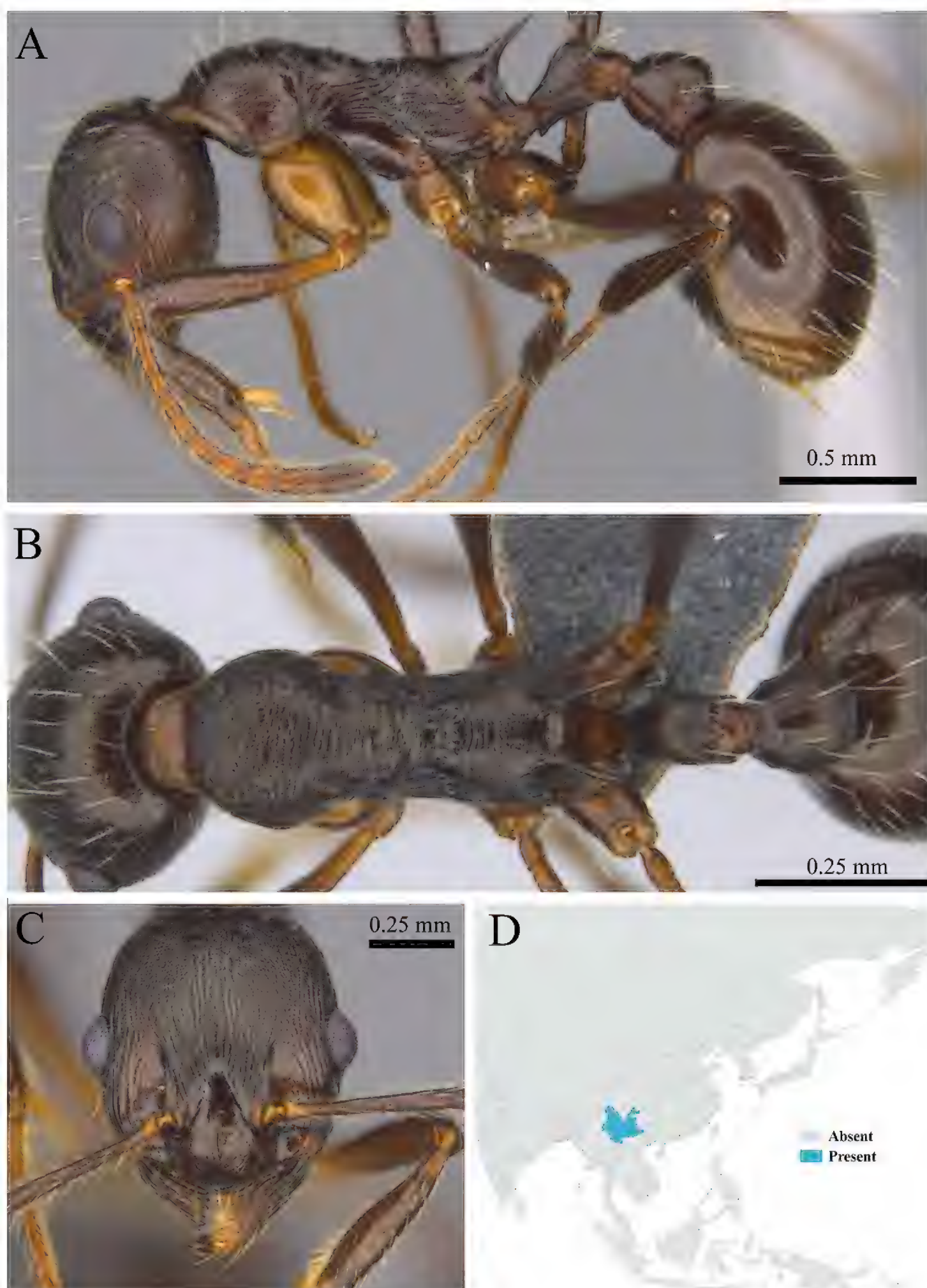
Monomorium sp1

Figure 78. *Monomorium* sp. clm01 worker (MCZ-ENT00759771) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



Myrmica draco

Figure 79. *Myrmica draco* worker (MCZ-ENT00759985) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



Myrmica pleiorhytida

Figure 80. *Myrmica pleiorhytida* worker (MCZ-ENT00759935) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.

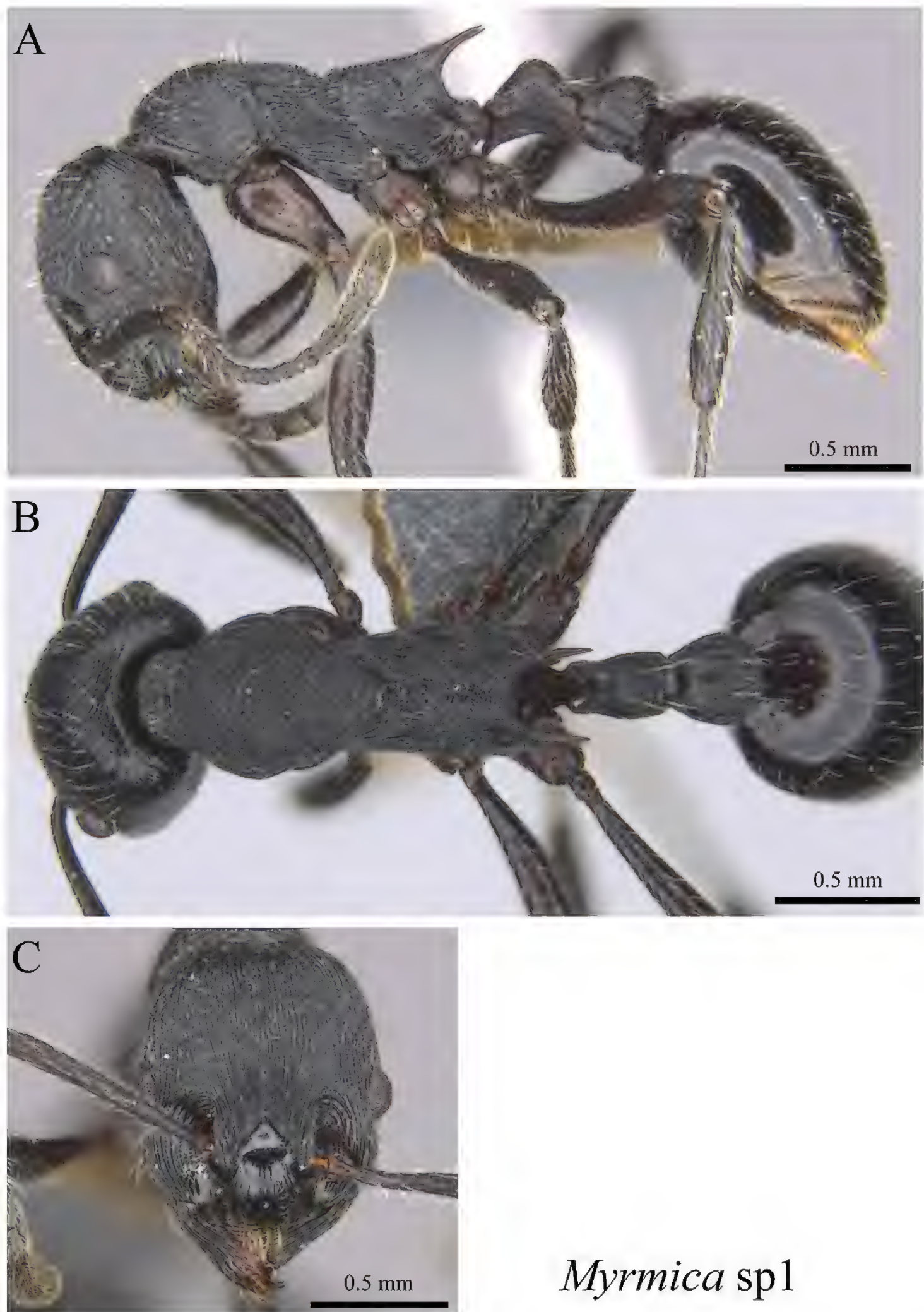
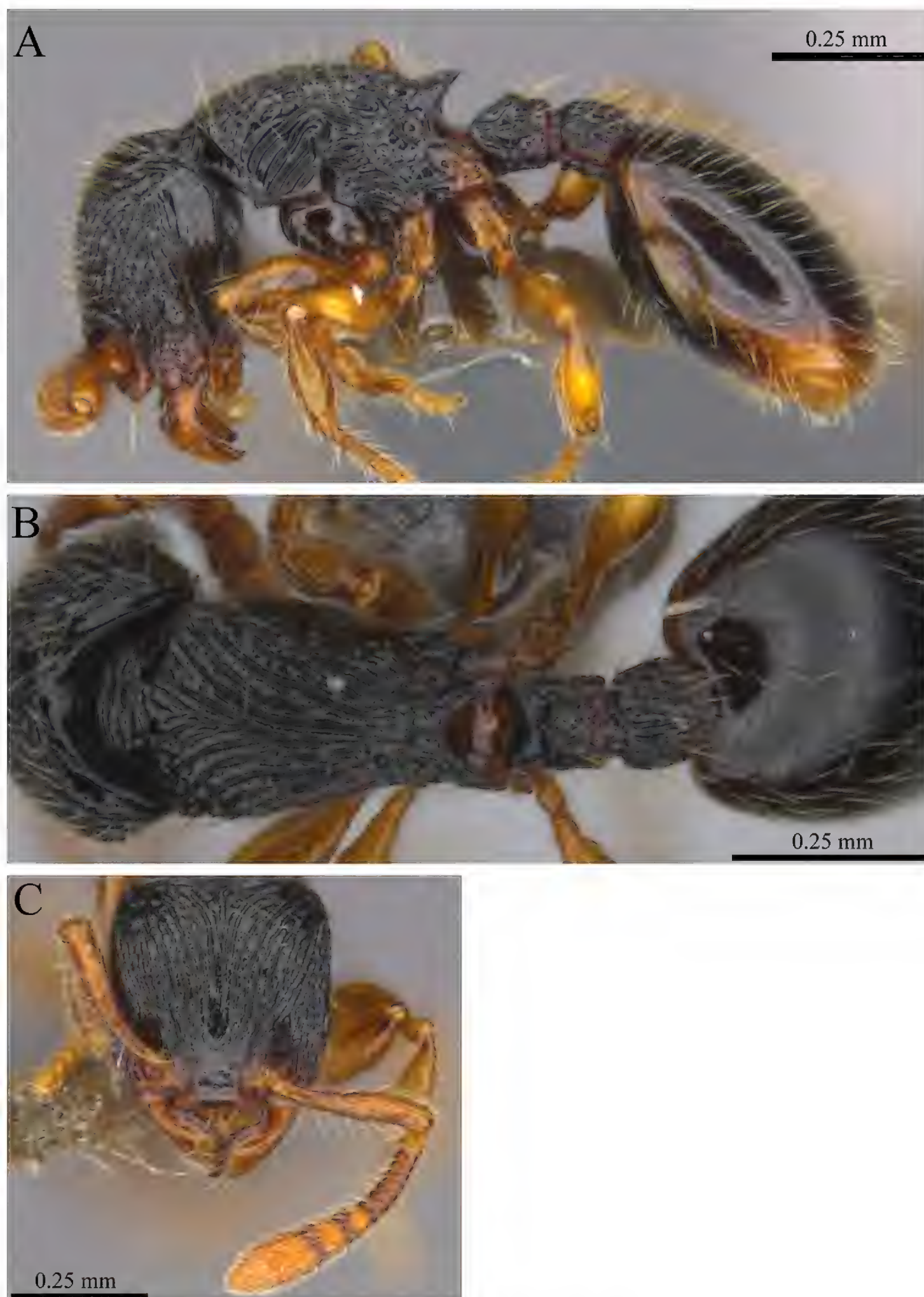
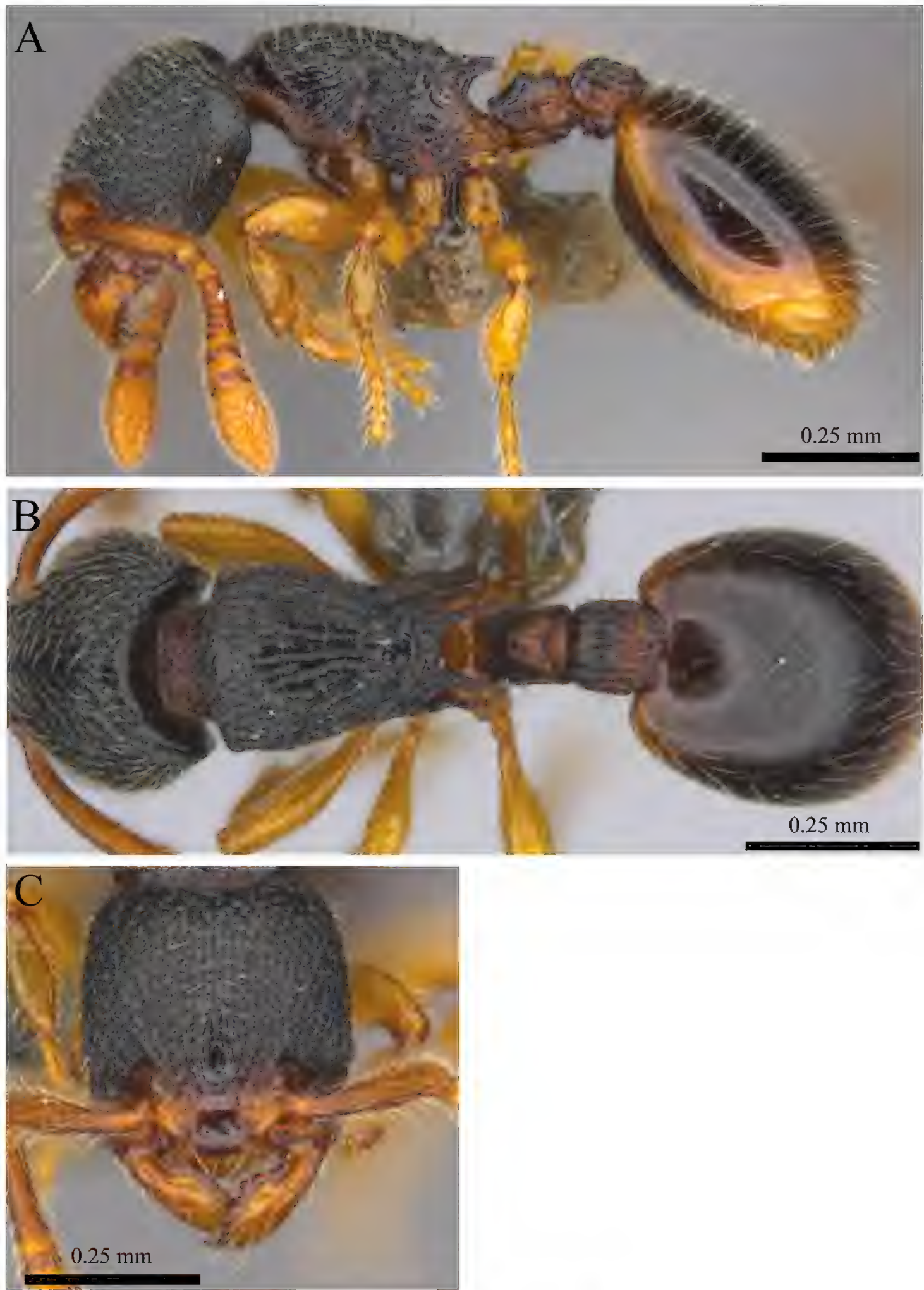


Figure 8I. *Myrmica* sp. clm01 worker (MCZ-ENT00763256) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



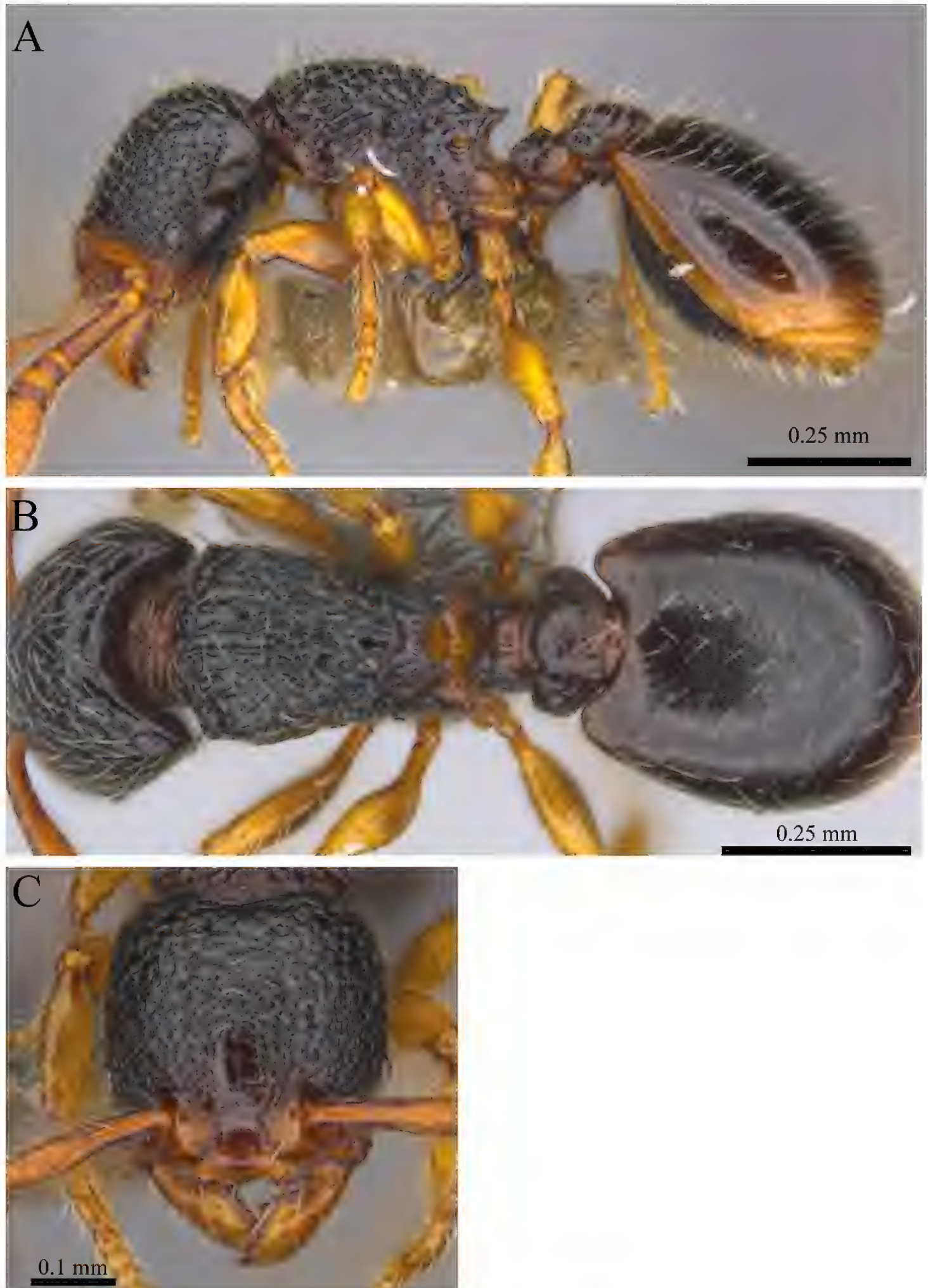
Myrmecina sp1

Figure 82. *Myrmecina* sp. clm01 worker (MCZ-ENT00759959) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



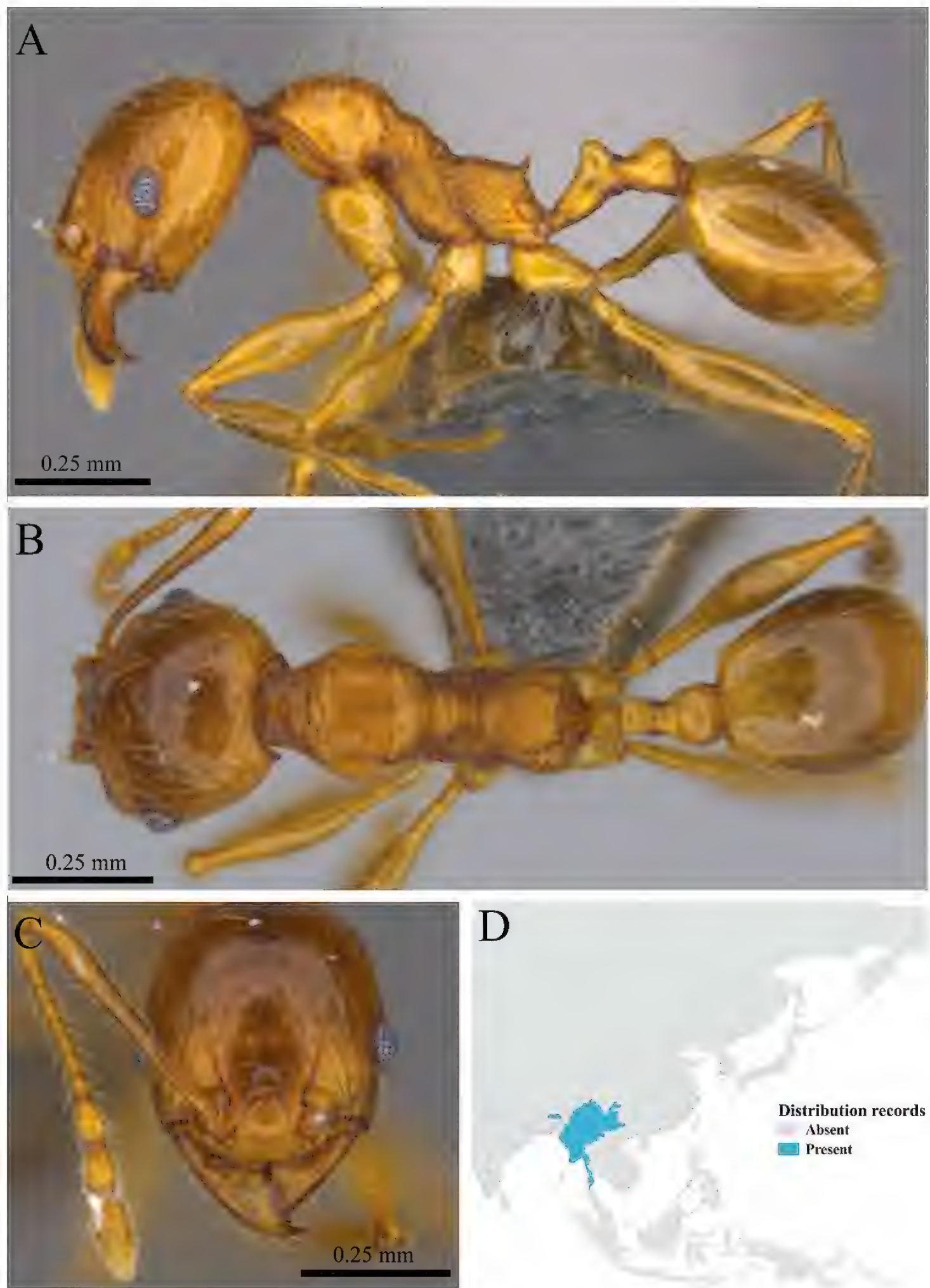
Myrmecina sp2

Figure 83. *Myrmecina* sp. clm02 worker (MCZ-ENT00759803). **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



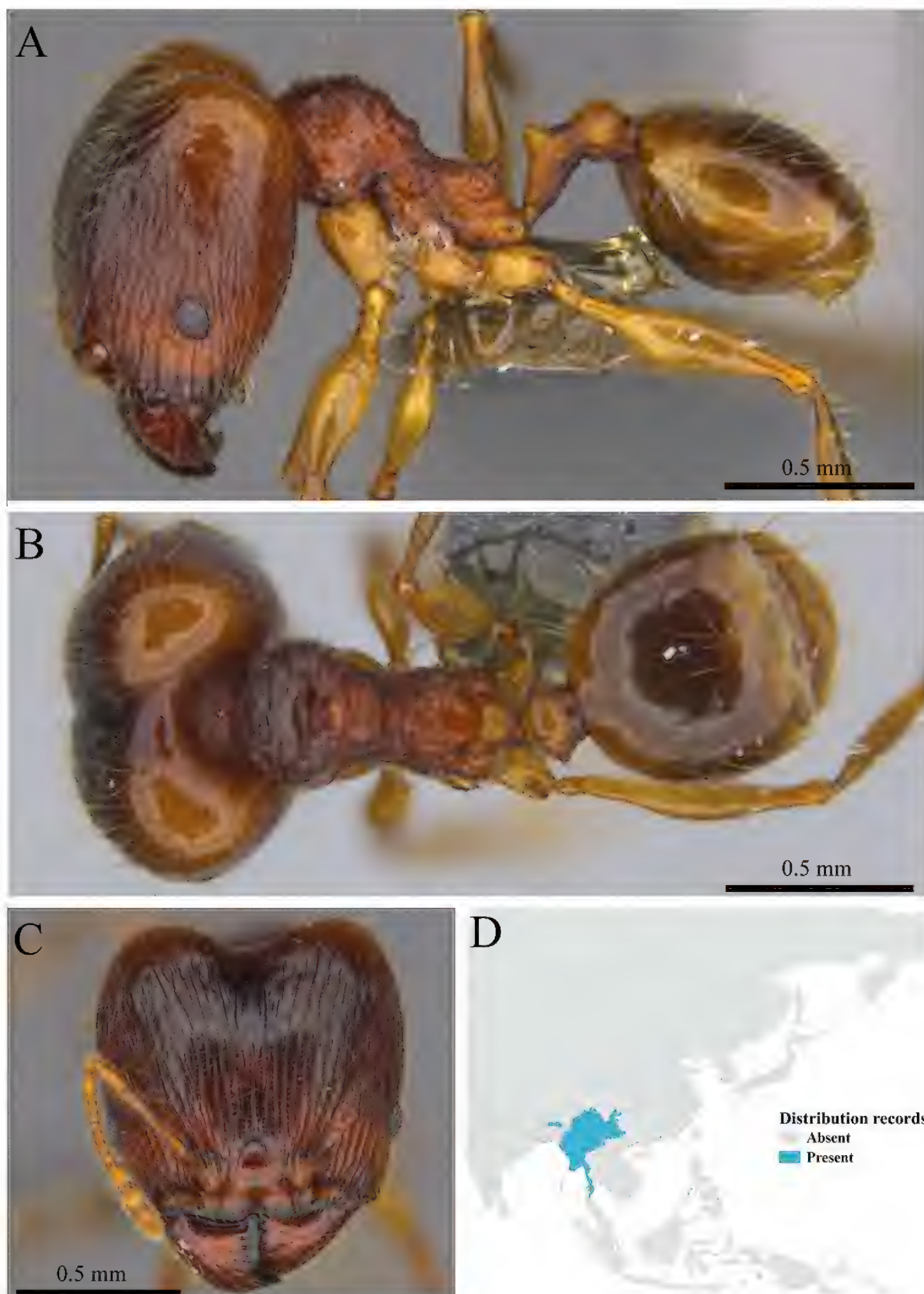
Myrmecina sp3

Figure 84. *Myrmecina* sp. clm03 worker (MCZ-ENT00763515). **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



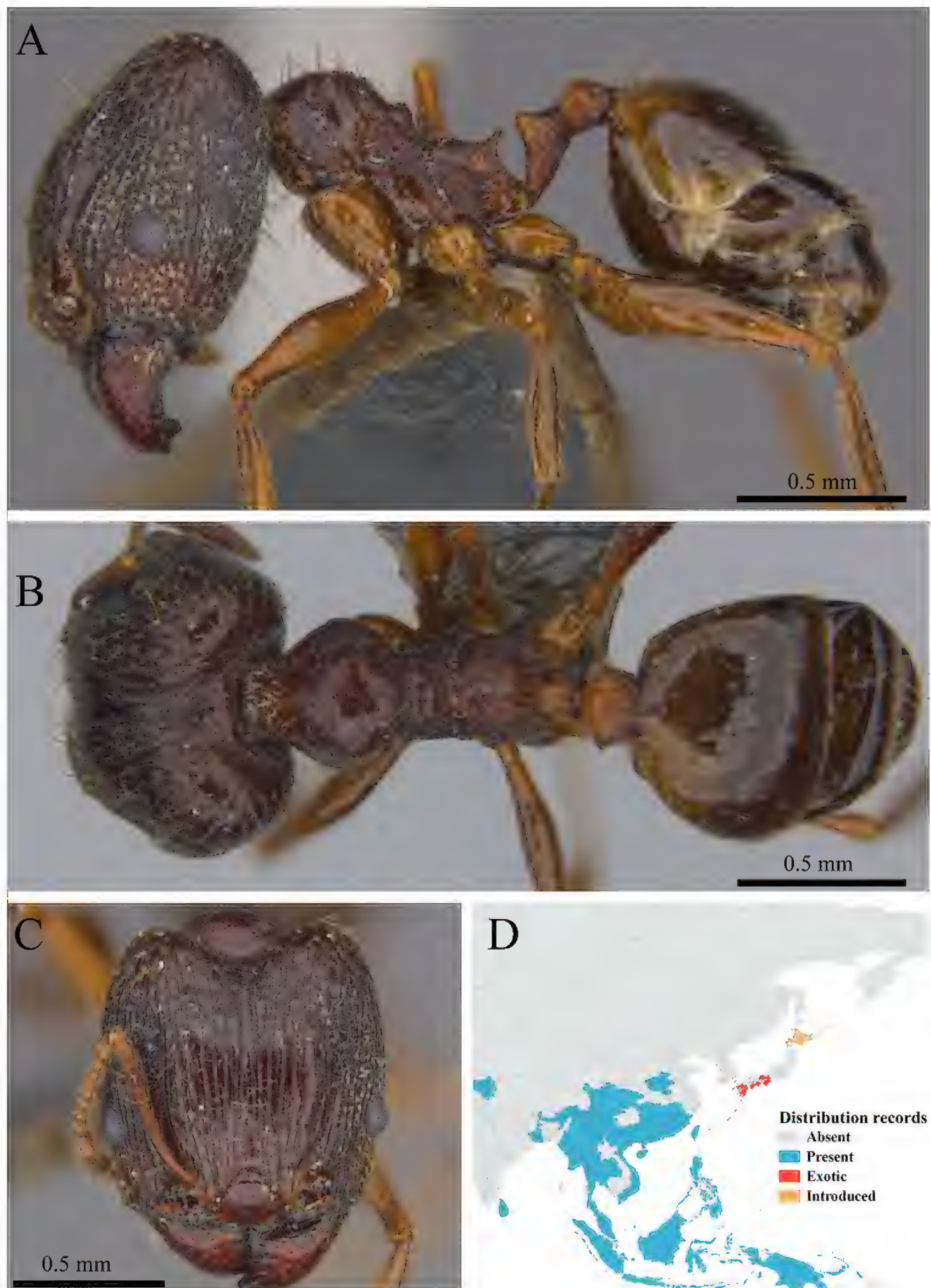
Pheidole allani

Figure 85. *Pheidole allani* minor worker (MCZ-ENT00759865) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



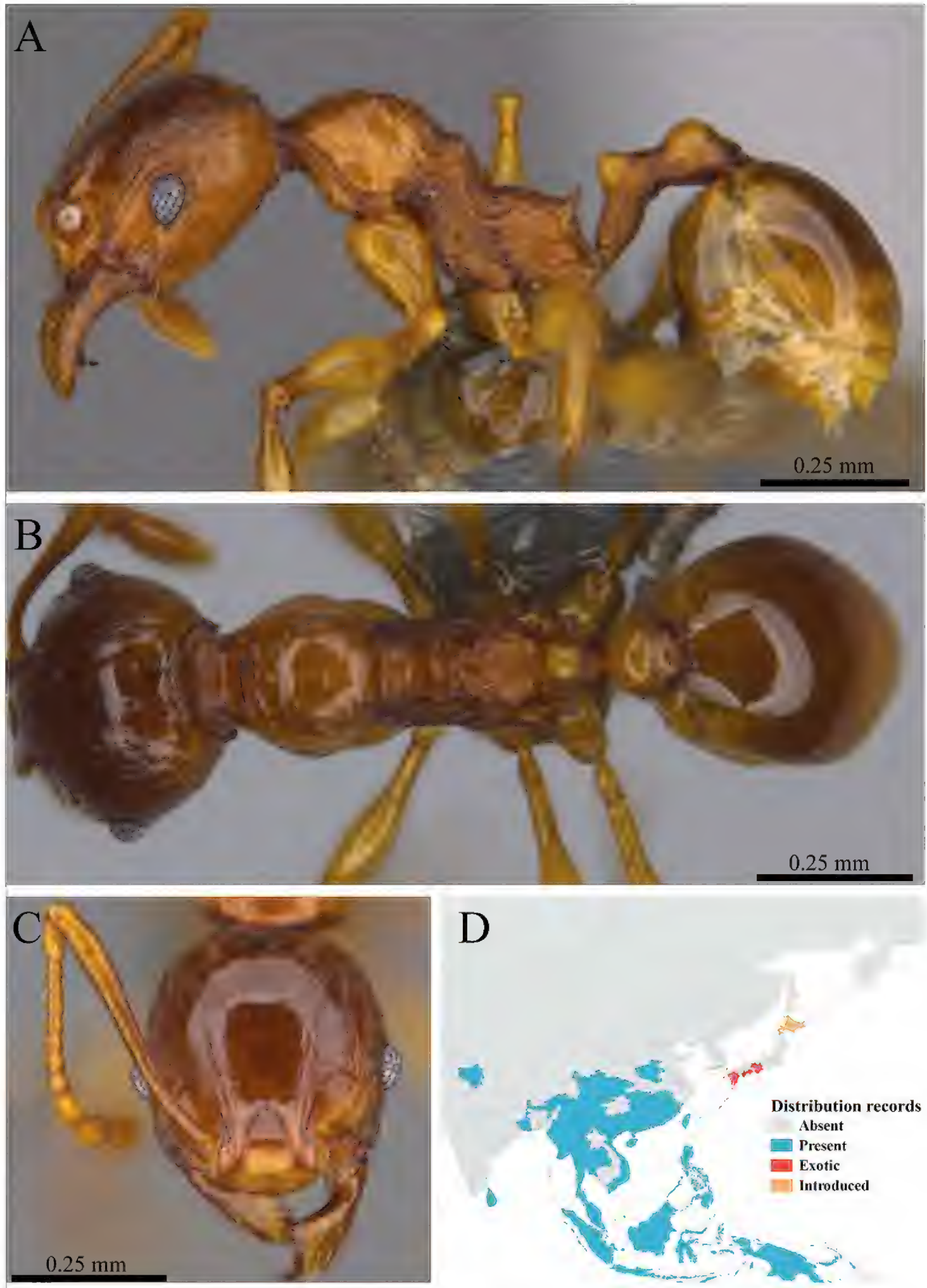
Pheidole allani

Figure 86. *Pheidole allani* major worker (MCZ-ENT00759866) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



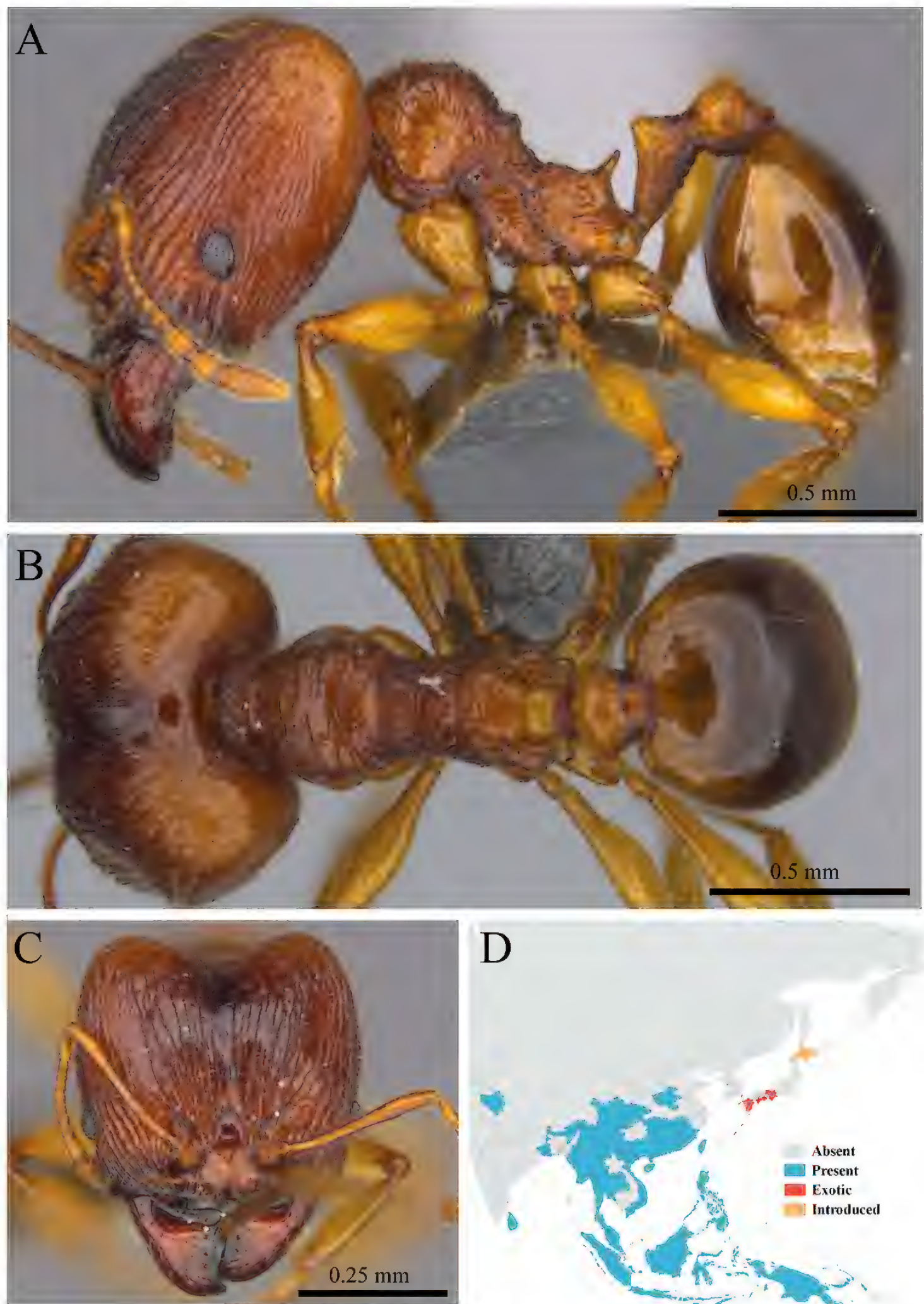
Pheidole fervens

Figure 87. *Pheidole fervens* worker (MCZ-ENT00764619) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



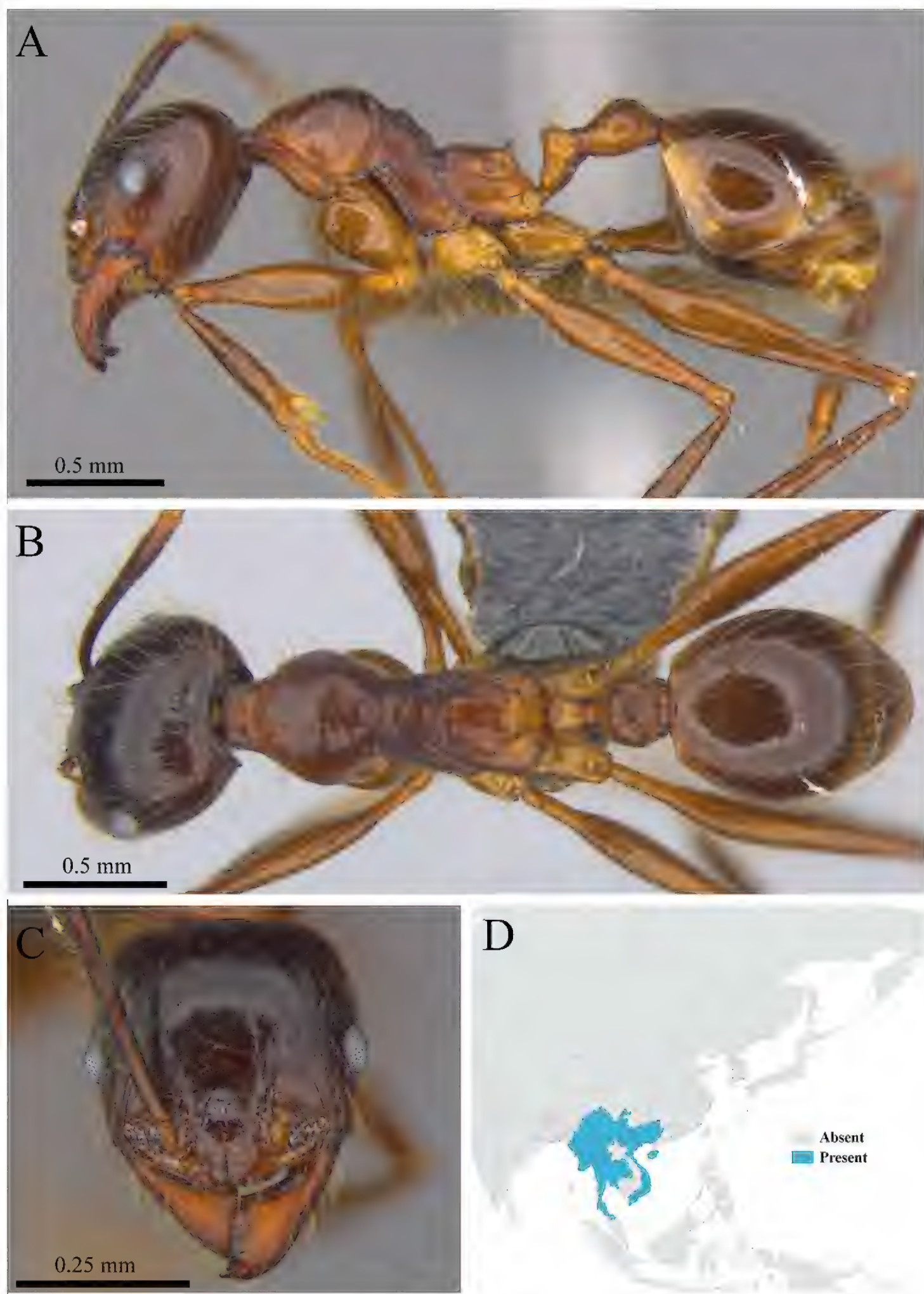
Pheidole fervida

Figure 88. *Pheidole fervida* minor worker (MCZ-ENT00759918) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



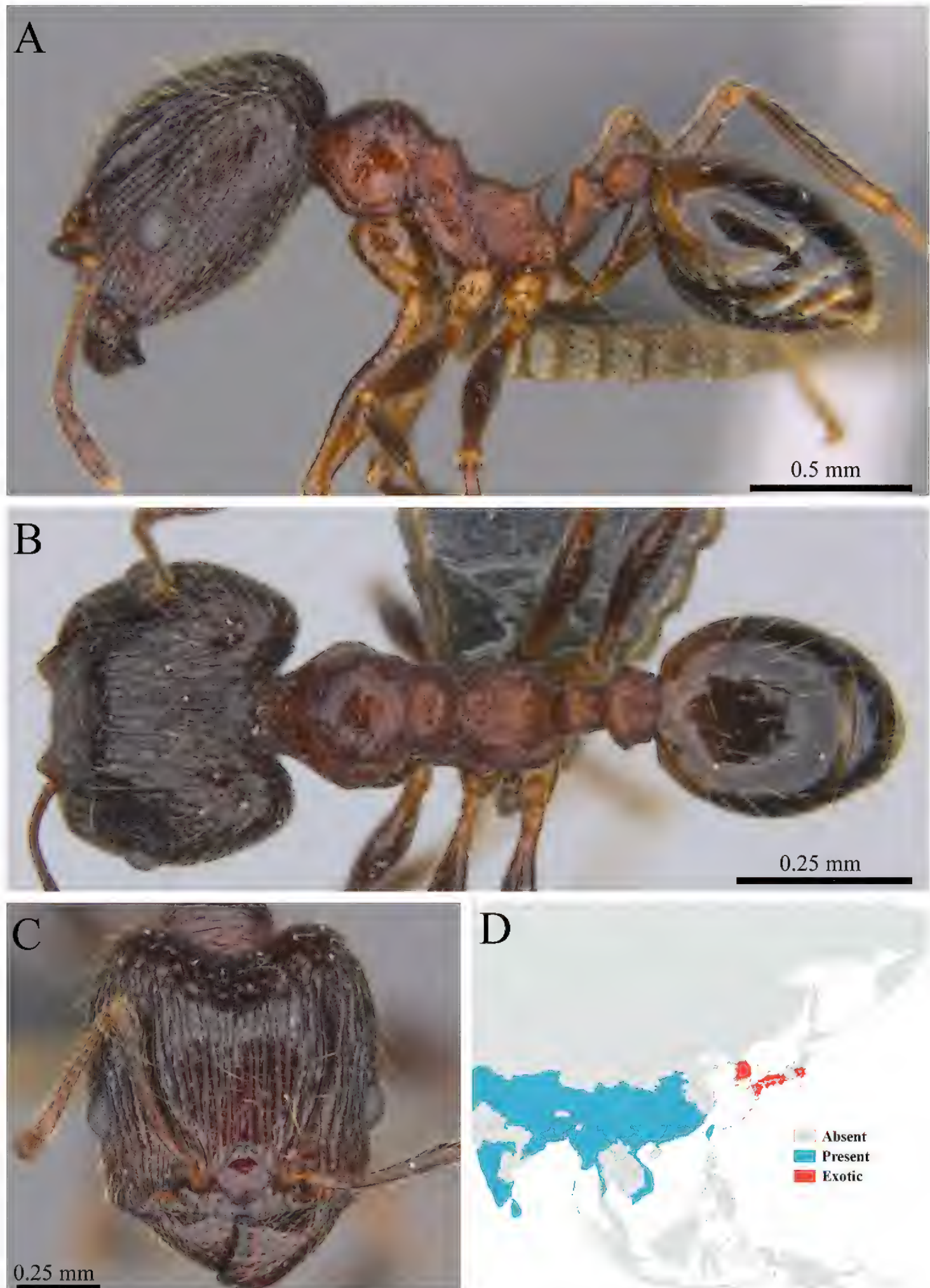
Pheidole fervida

Figure 89. *Pheidole fervida* major worker (MCZ-ENT00760026) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



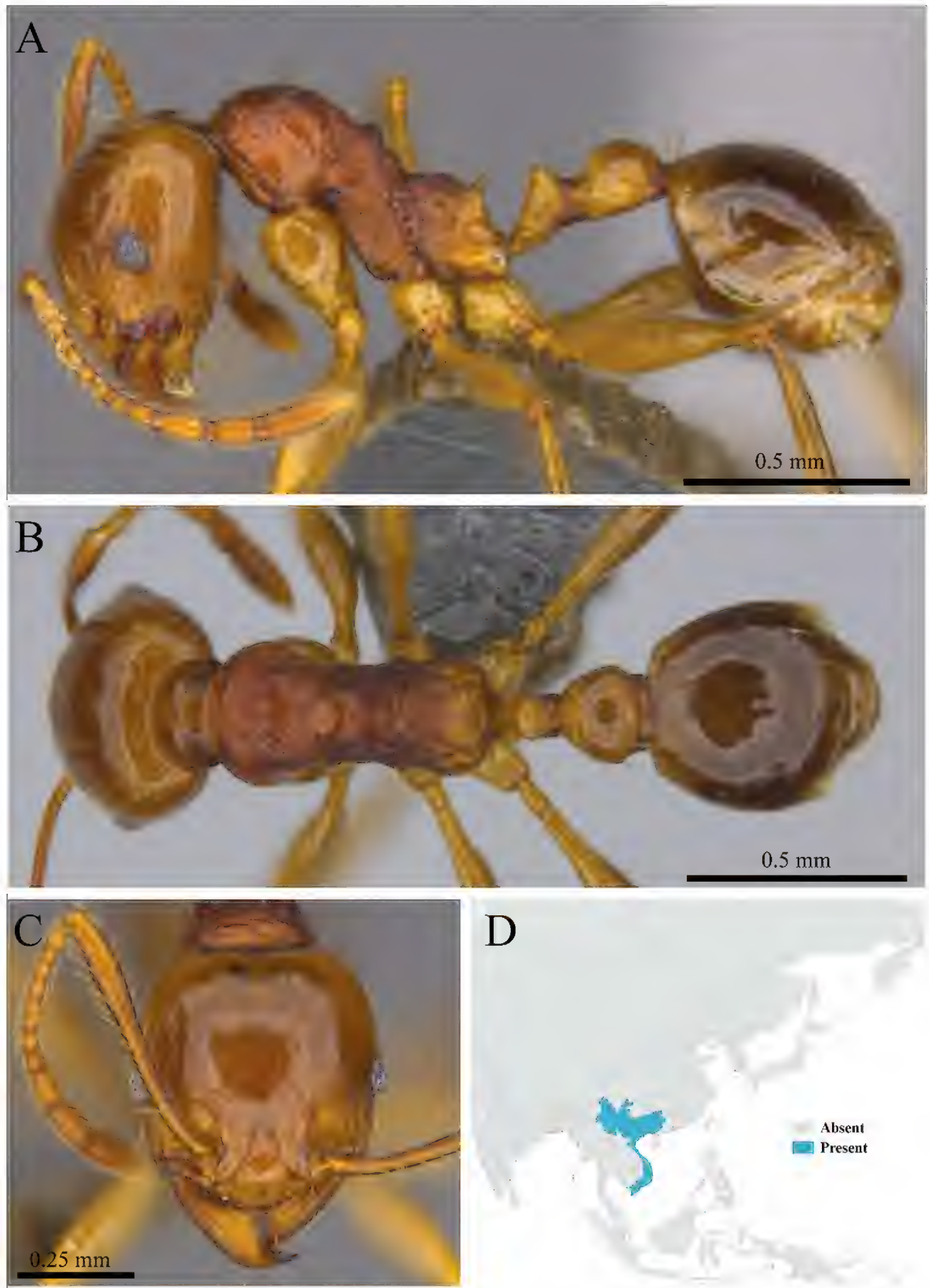
Pheidole gatesi

Figure 90. *Pheidole gatesi* worker (MCZ-ENT00763577) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



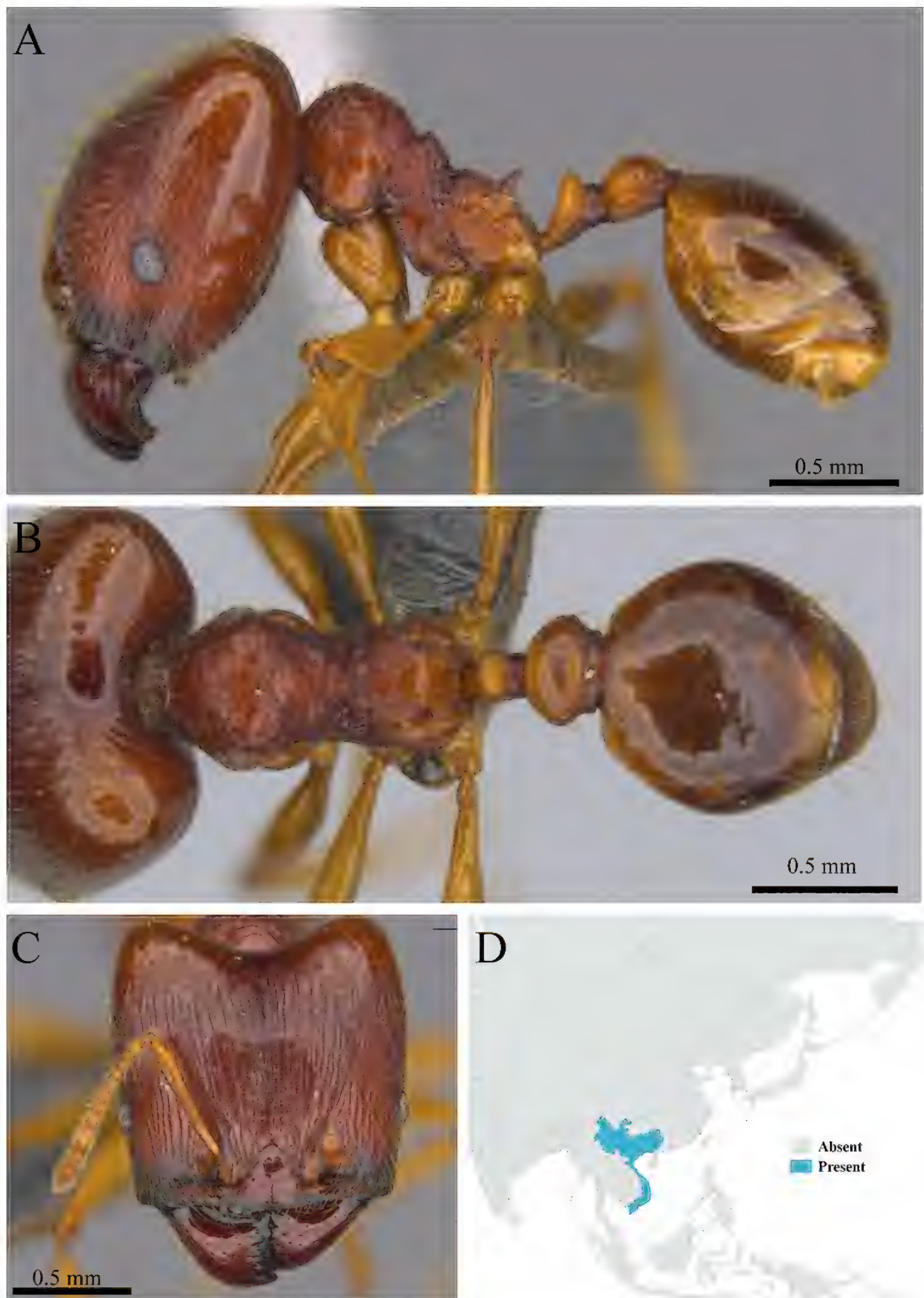
Pheidole indica

Figure 91. *Pheidole indica* worker (MCZ-ENT00762822) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



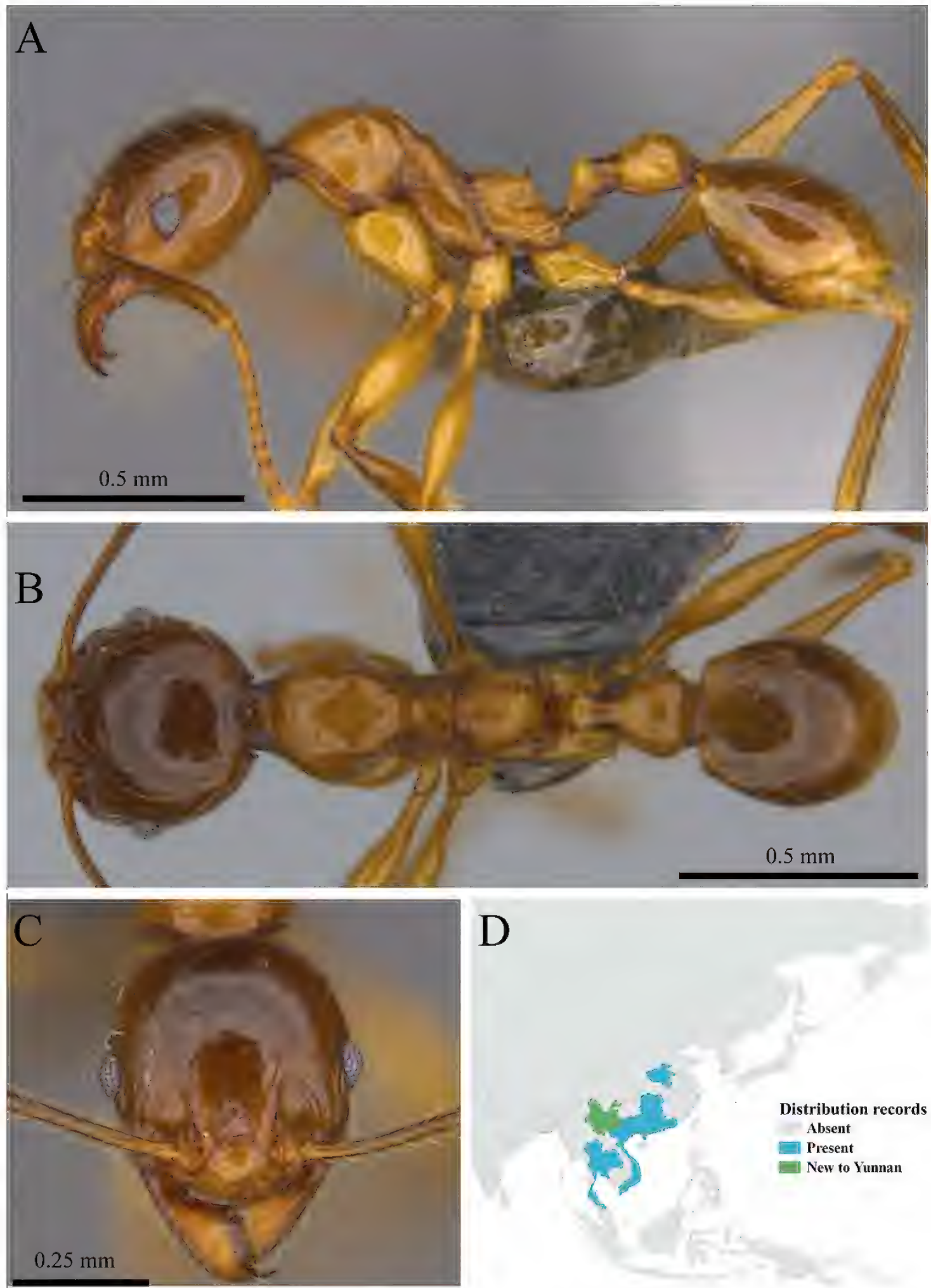
Pheidole magna minor

Figure 92. *Pheidole magna* minor worker (MCZ-ENT00759762) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



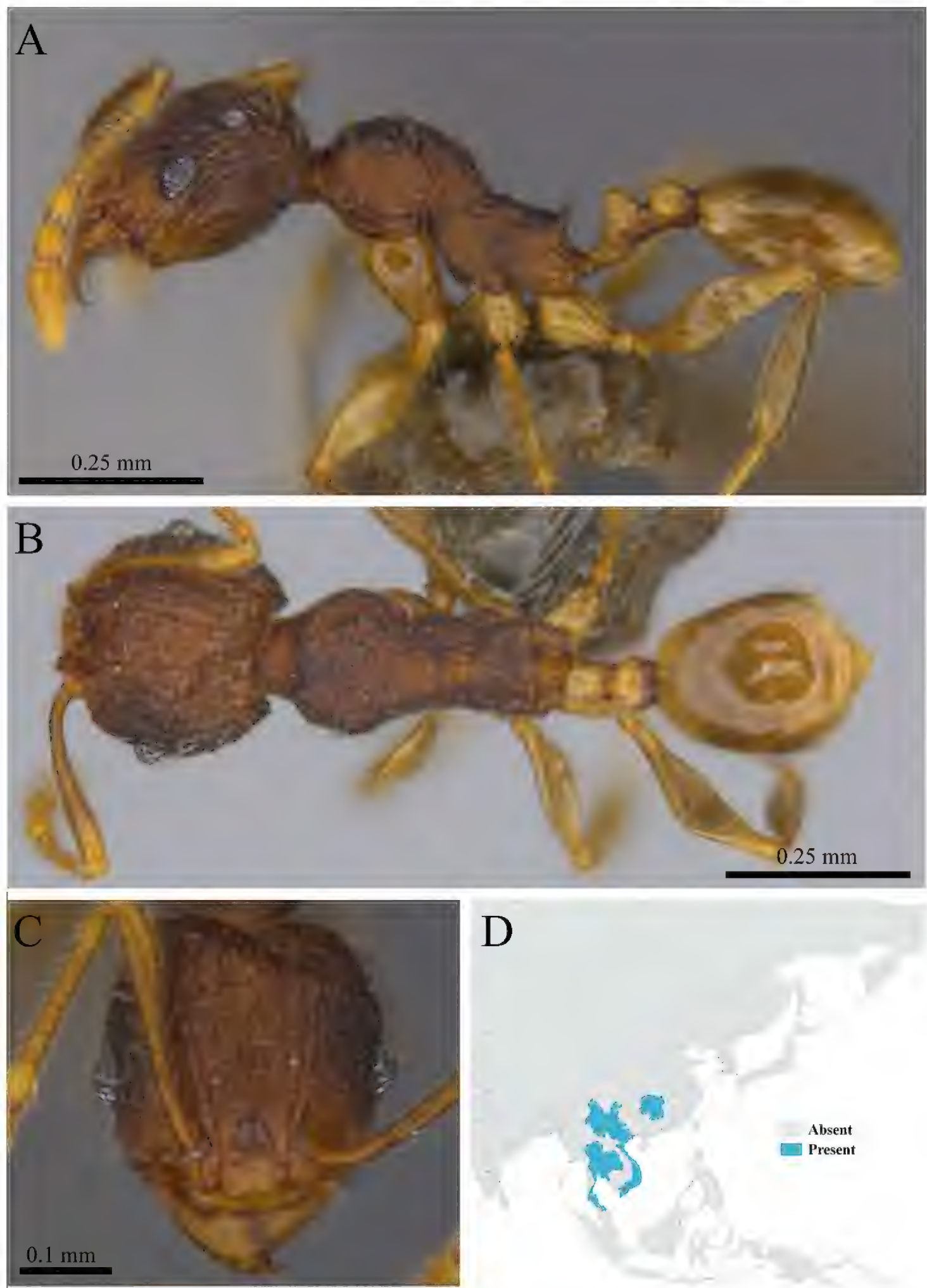
Pheidole magna

Figure 93. *Pheidole magna* major worker (MCZ-ENT00759980) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



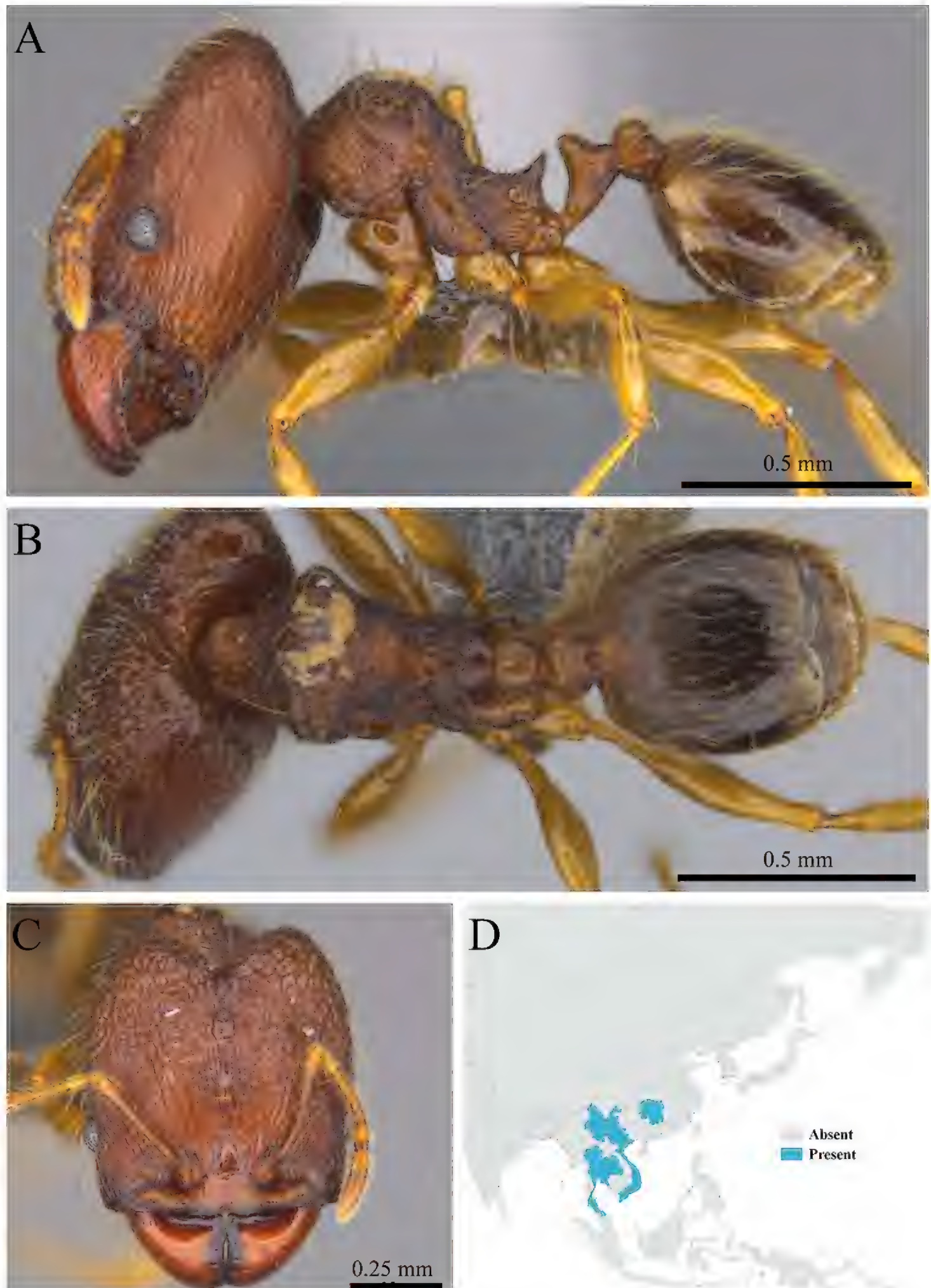
Pheidole nodifera

Figure 94. *Pheidole nodifera* worker (MCZ-ENT00759837, new to Yunnan) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



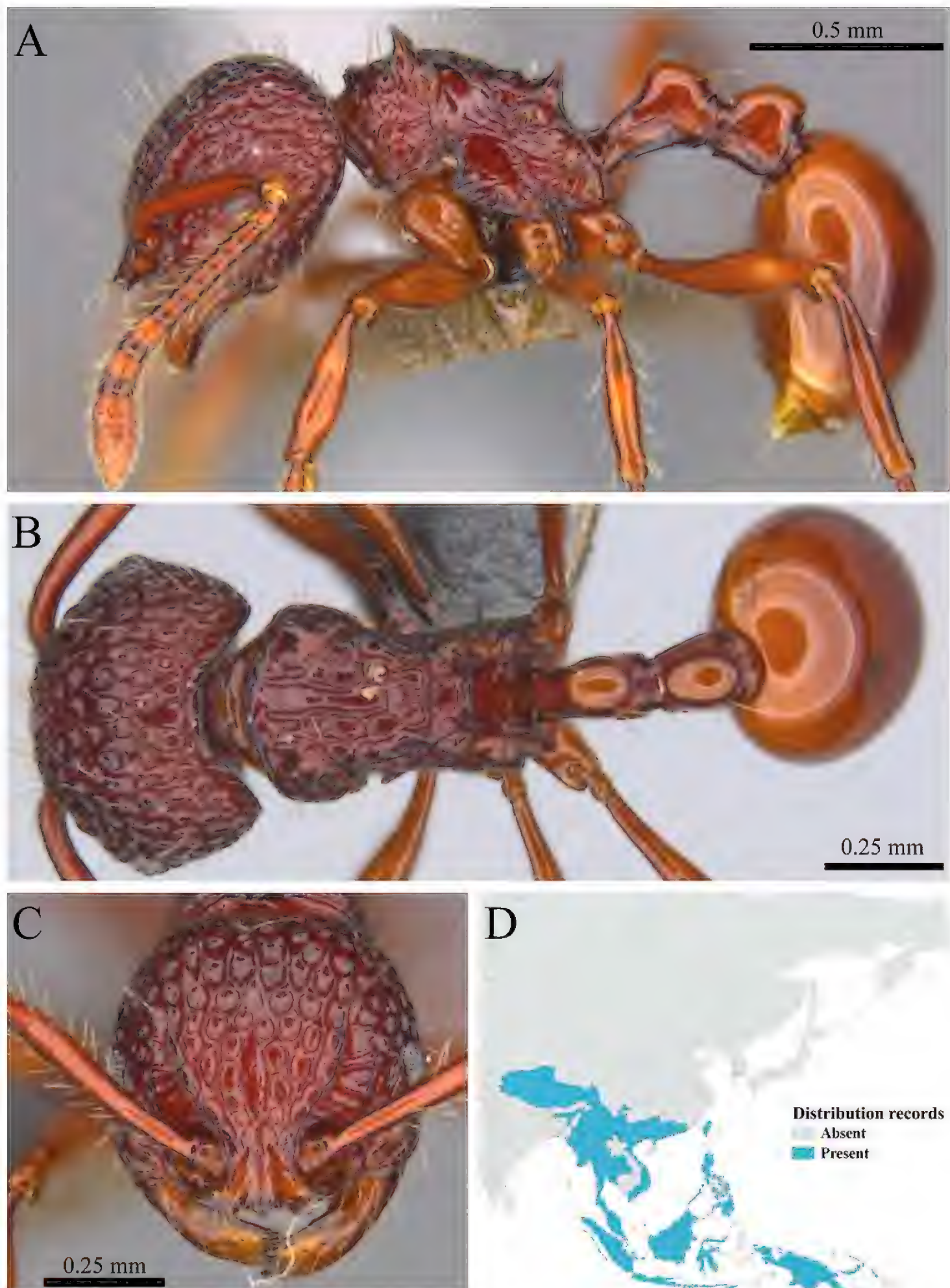
Pheidole zoceana

Figure 95. *Pheidole zoceana* minor worker (MCZ-ENT00760015) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



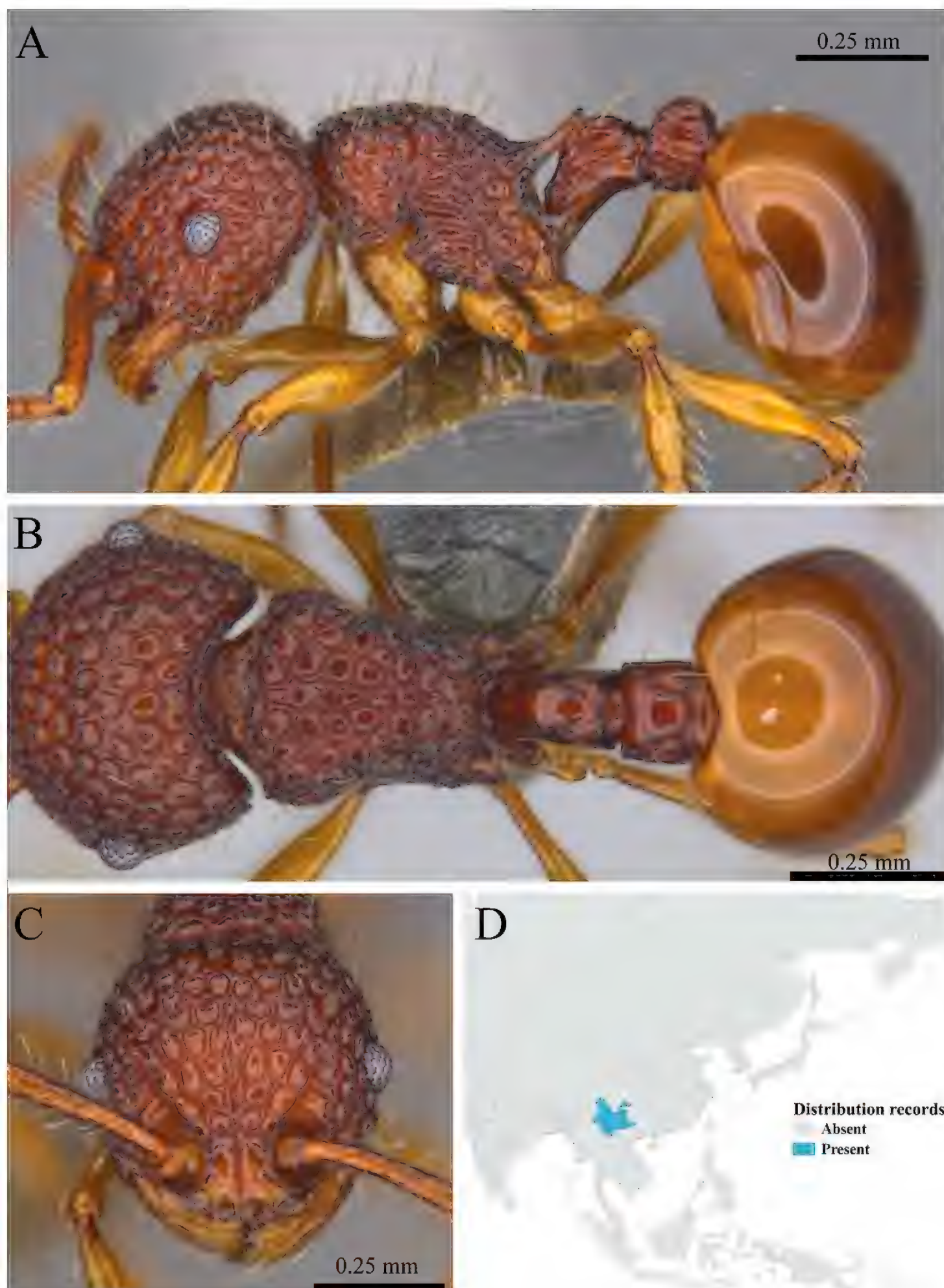
Pheidole zoceana

Figure 96. *Pheidole zoceana* major worker (MCZ-ENT00760016) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



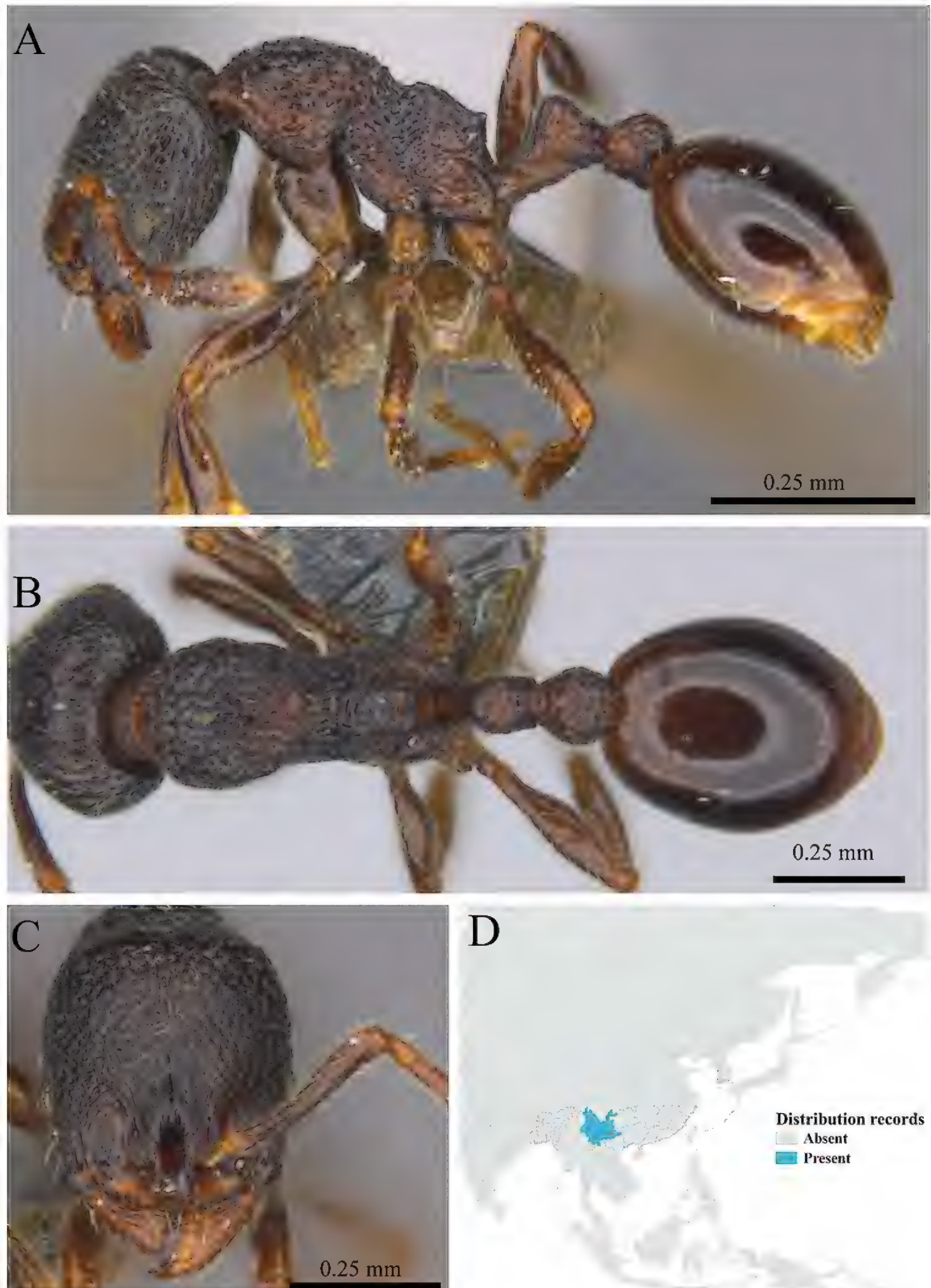
Pristomyrmex brevispinosus

Figure 97. *Pristomyrmex brevispinosus* worker (MCZ-ENT00763505) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



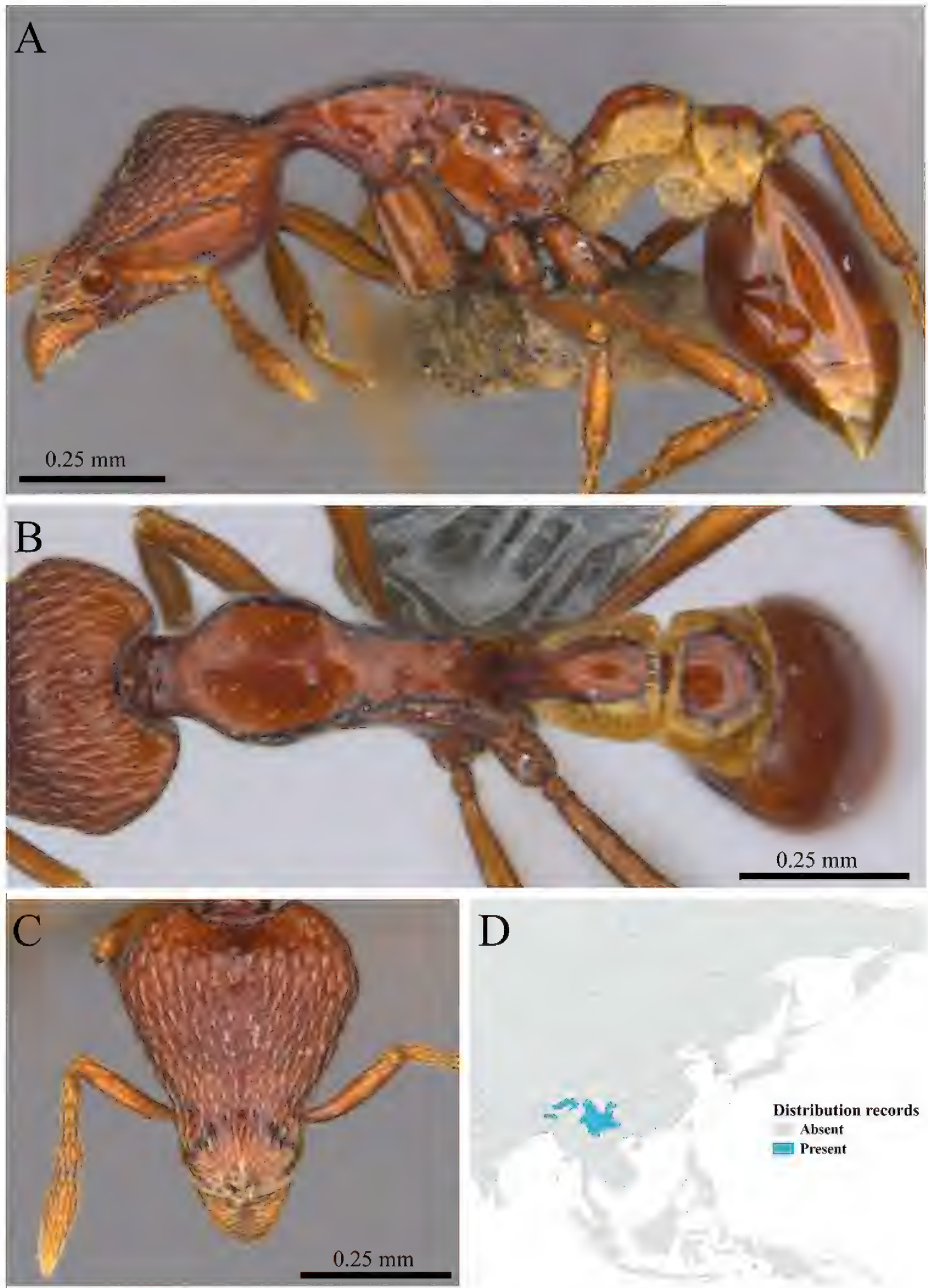
Pristomyrmex hamatus

Figure 98. *Pristomyrmex hamatus* worker (MCZ-ENT00763502) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



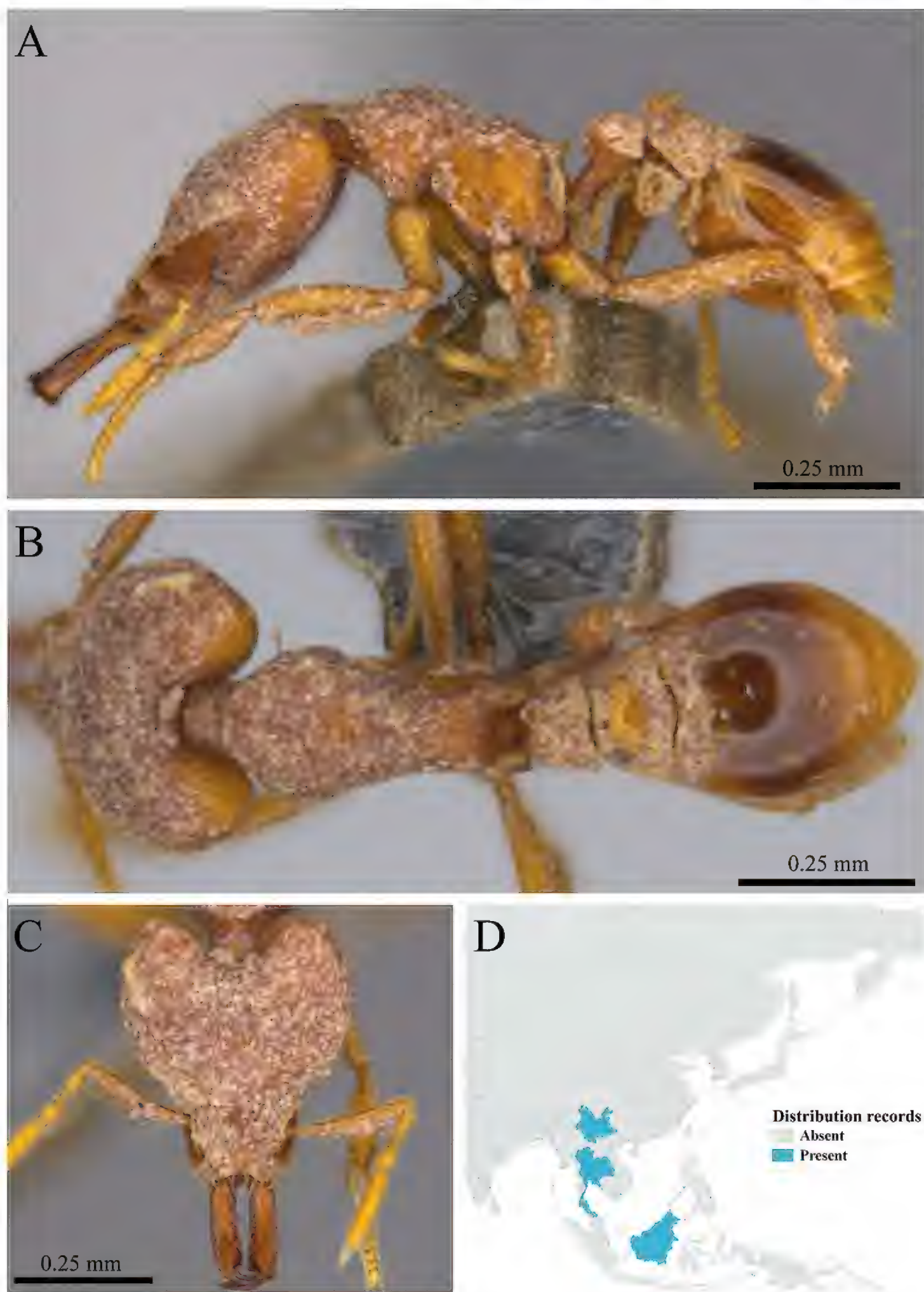
Stenamma wumengense

Figure 99. *Stenamma wumengense* worker (MCZ-ENT00762907) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



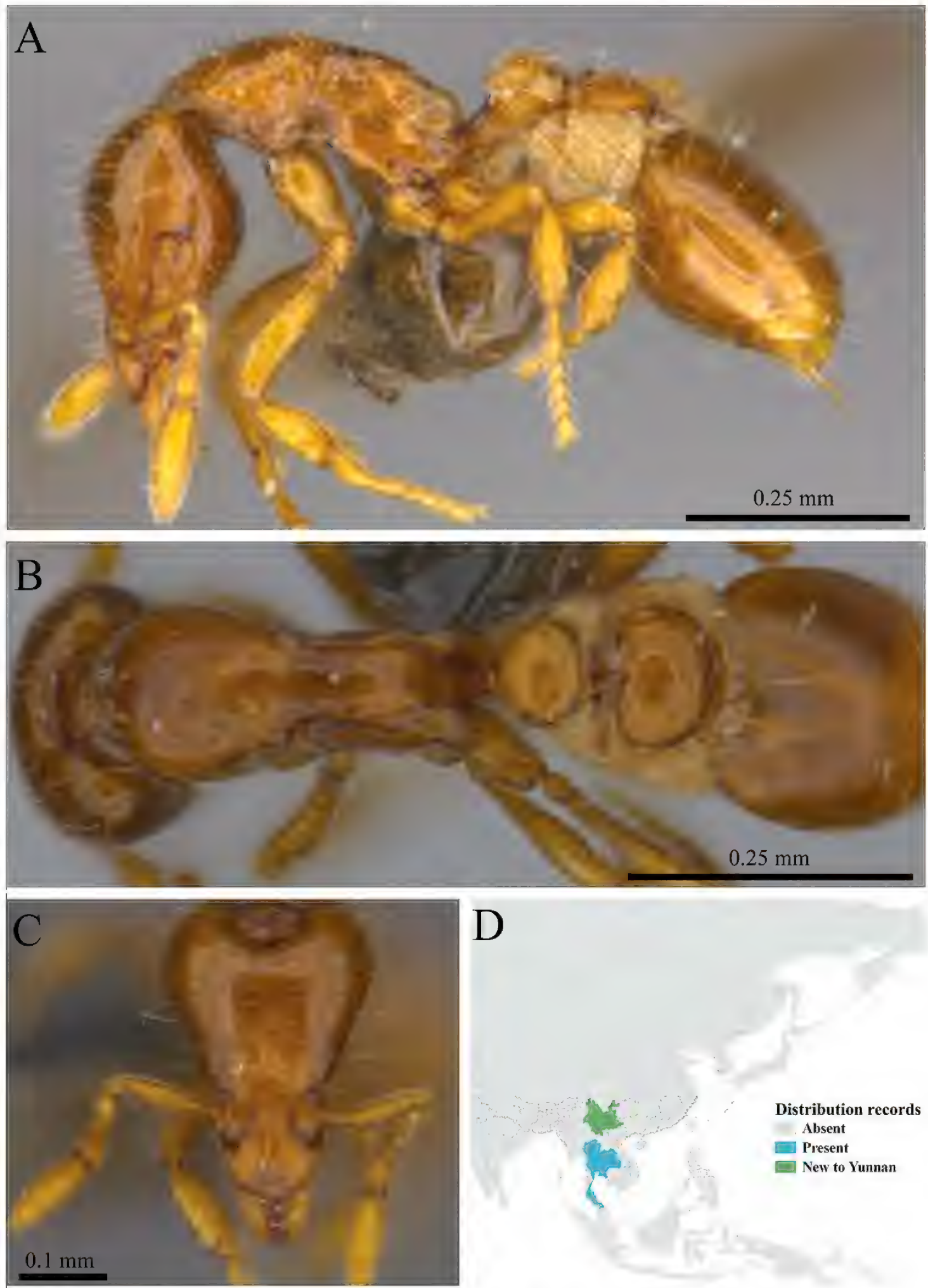
Strumigenys assamensis

Figure 100. *Strumigenys assamensis* worker (MCZ-ENT00759885) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



Strumigenys strygax

Figure 101. *Strumigenys strygax* worker (MCZ-ENT00763507) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



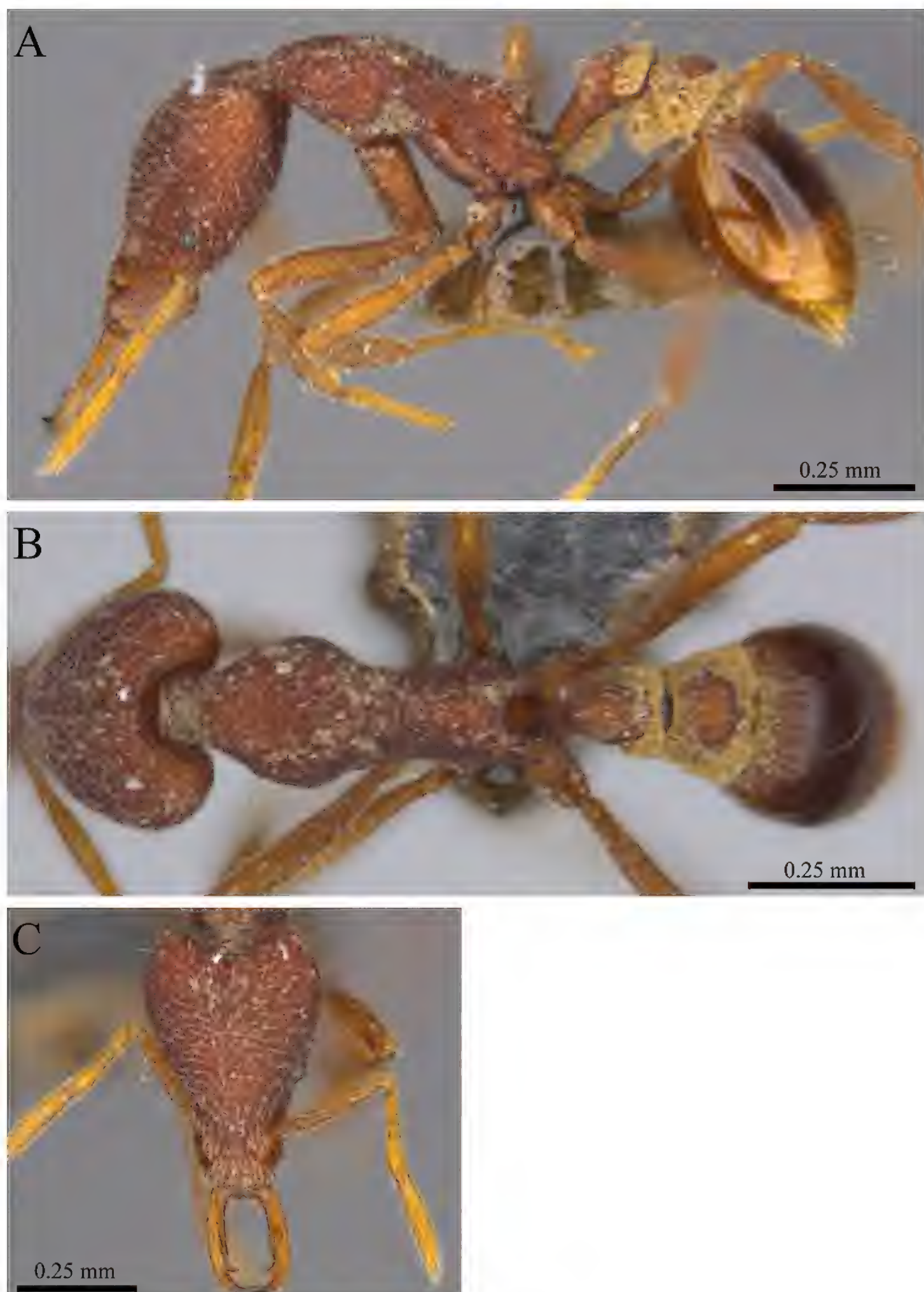
Strumigenys taphra

Figure 102. *Strumigenys taphra* worker (MCZ-ENT00759758, new to China) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



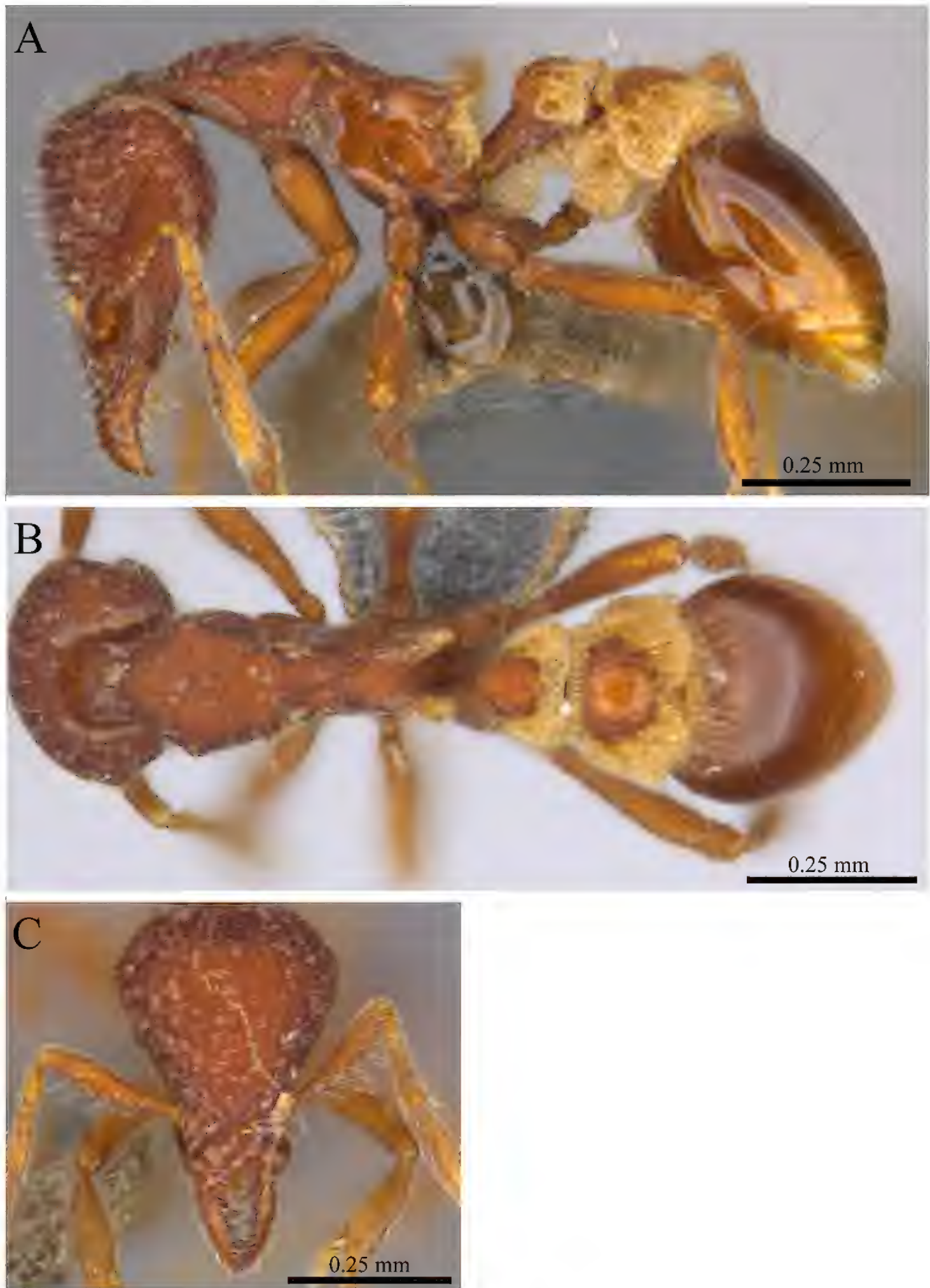
Strumigenys sp1

Figure 103. *Strumigenys* sp. clm01 worker (MCZ-ENT00763511) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



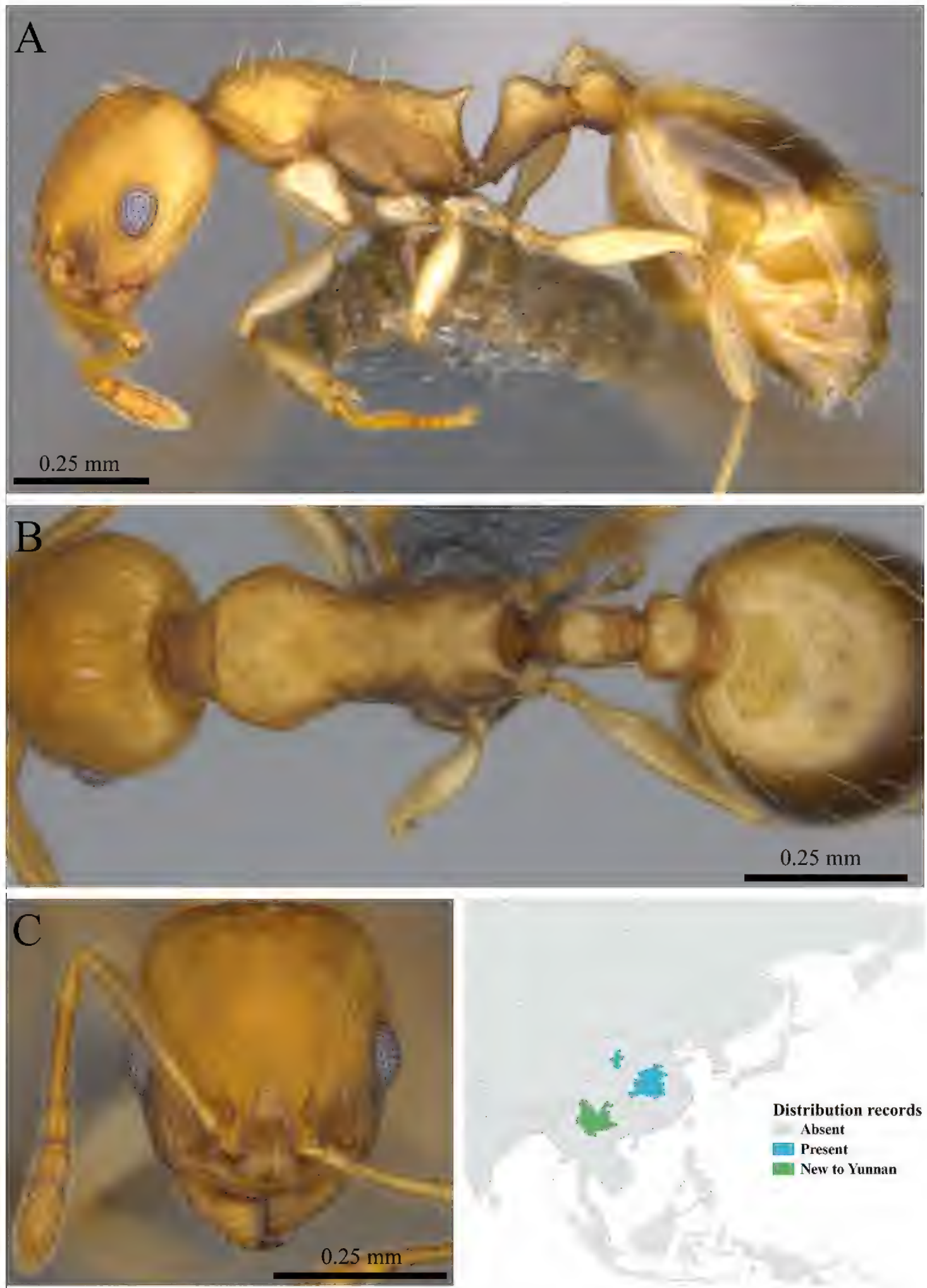
Strumigenys sp2

Figure 104. *Strumigenys* sp. clm02 worker (MCZ-ENT00759897) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



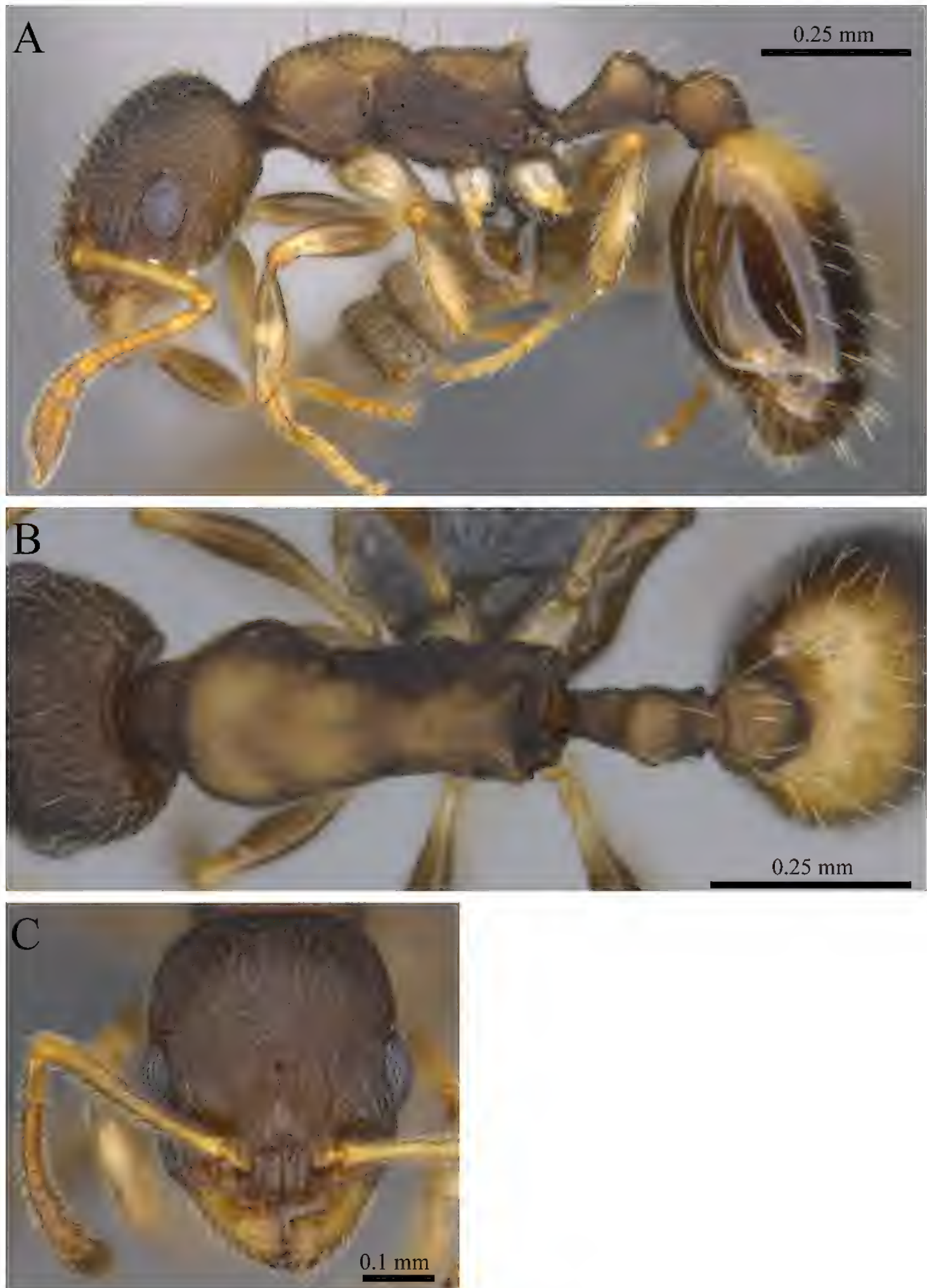
Strumigenys sp3

Figure 105. *Strumigenys* sp. clm03 worker (MCZ-ENT00759991) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



Temnothorax striatus

Figure 106. *Temnothorax striatus* worker (MCZ-ENT00759763, new to Yunnan) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



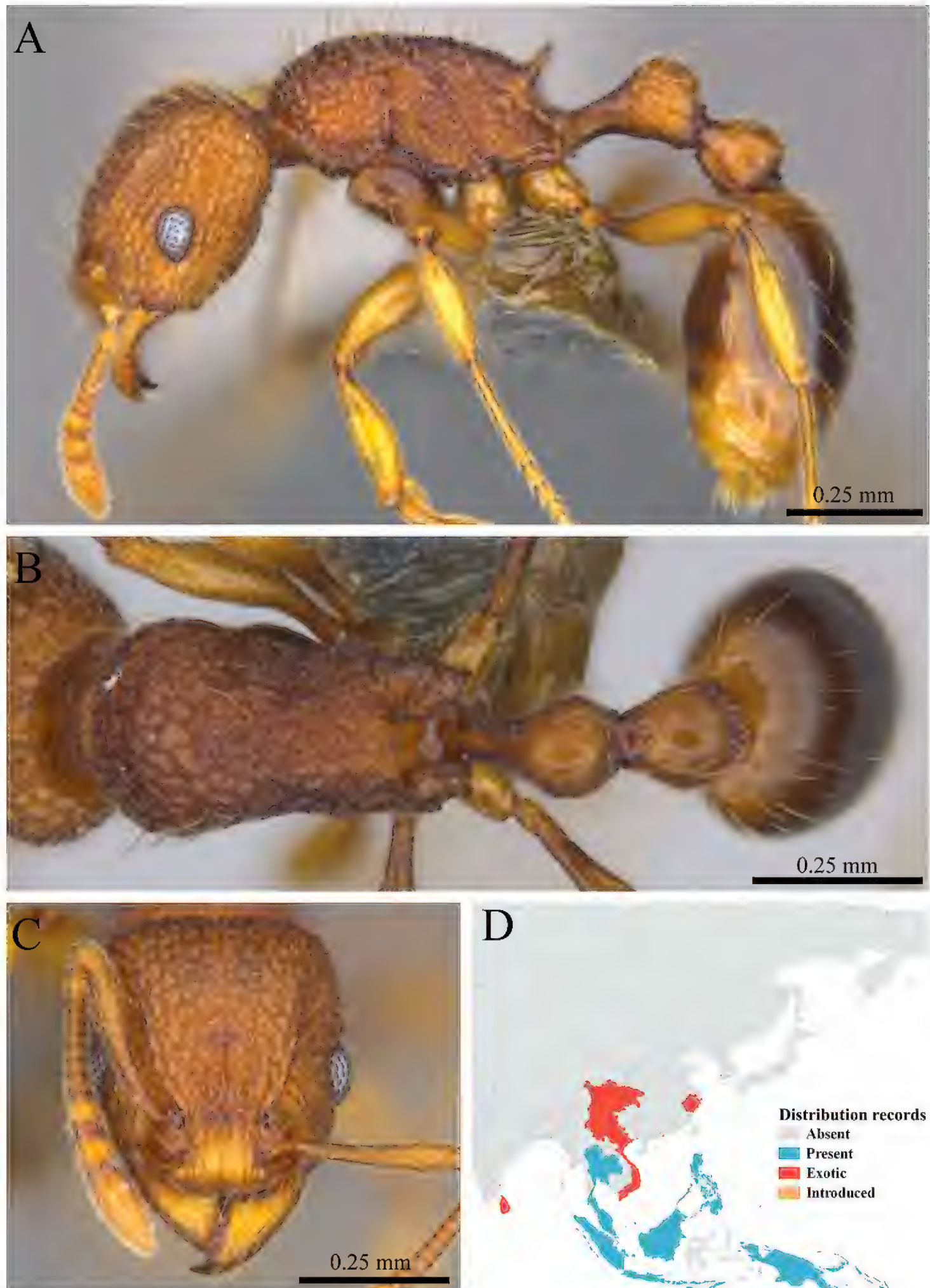
Temnothorax sp1

Figure 107. *Temnothorax* sp. clm01 worker (MCZ-ENT00759977) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



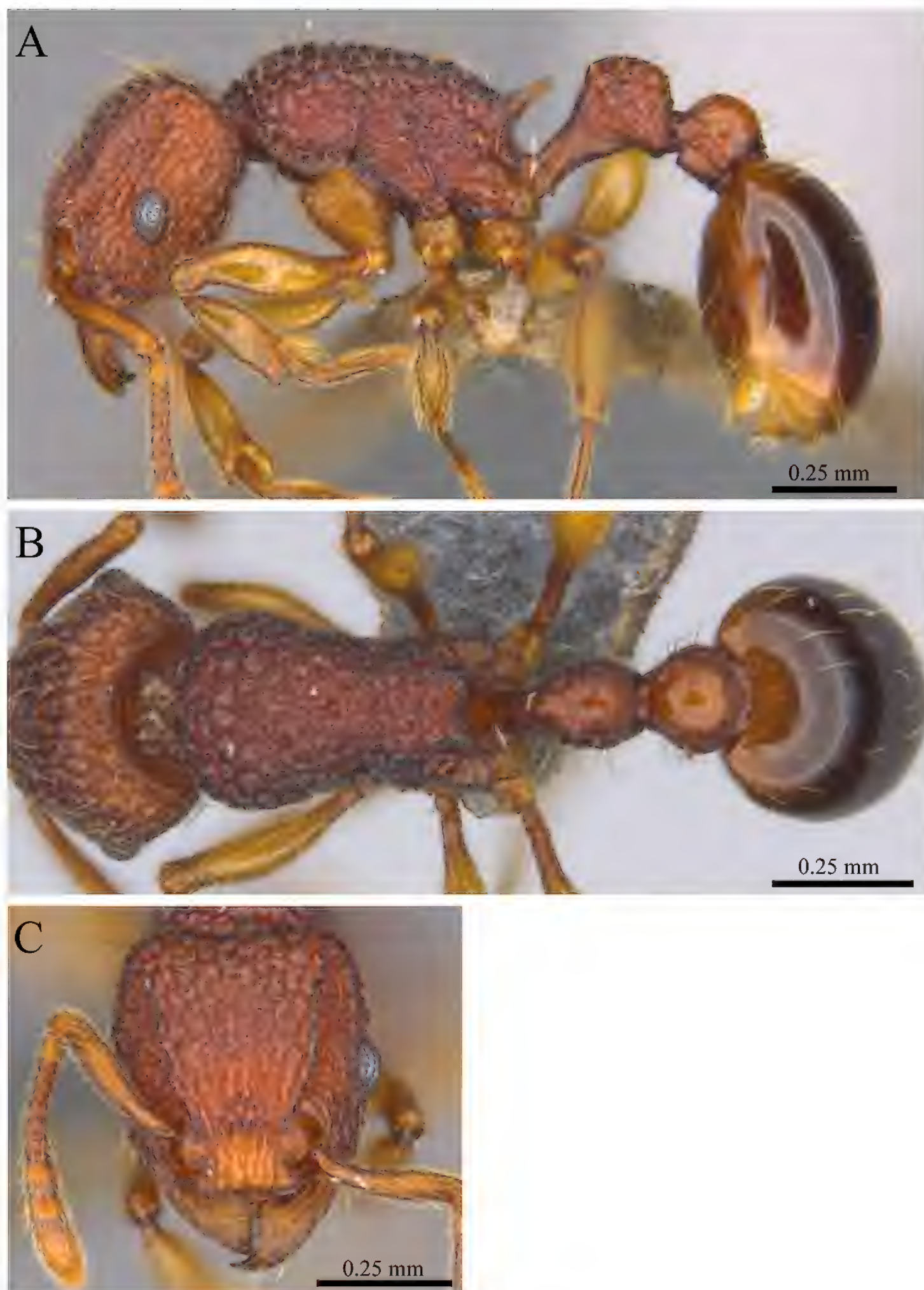
Temnothorax sp3

Figure 108. *Temnothorax* sp. clm03 worker (MCZ-ENT00763303) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



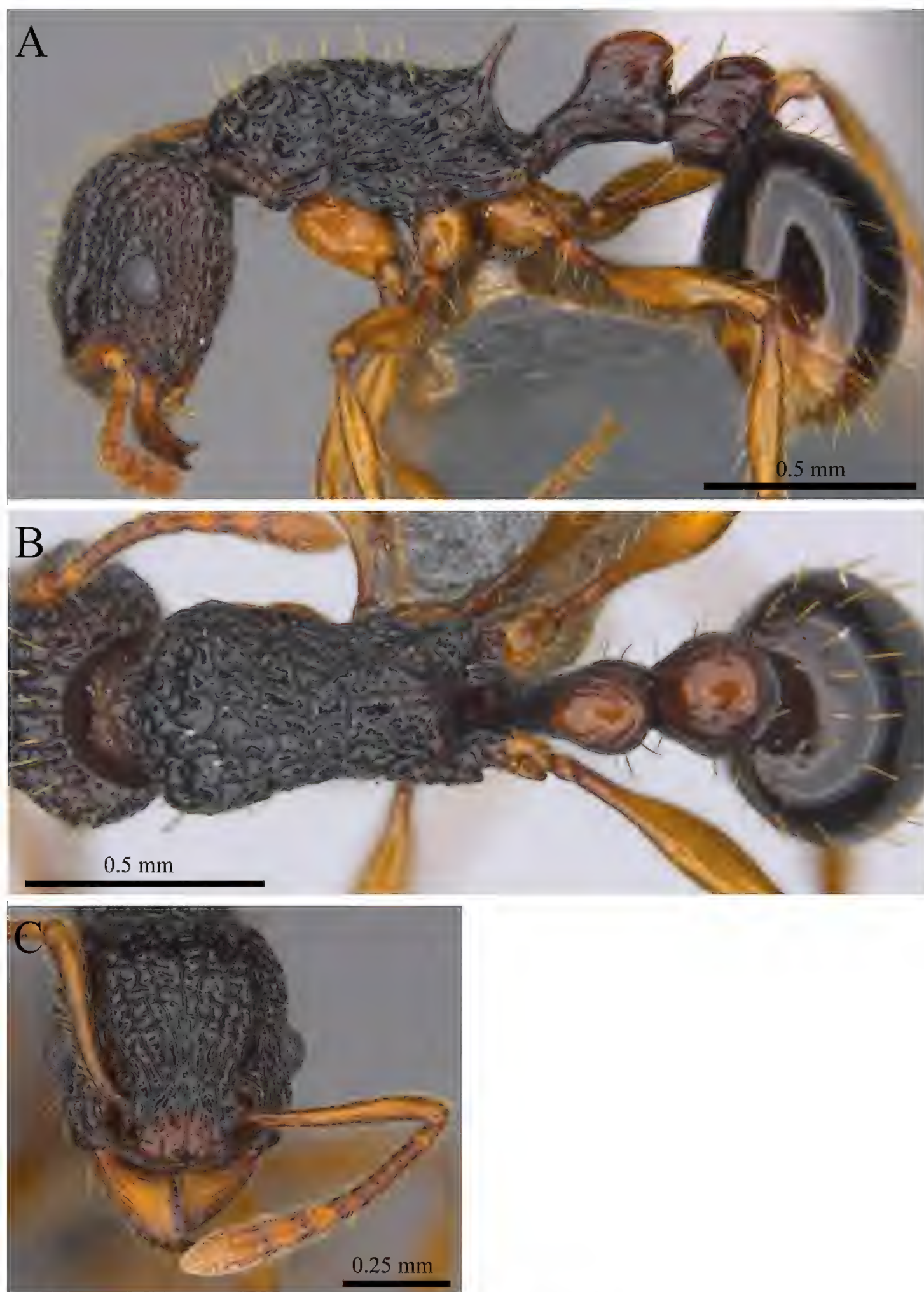
Tetramorium tonganum

Figure 109. *Tetramorium tonganum* worker (MCZ-ENT00764651) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



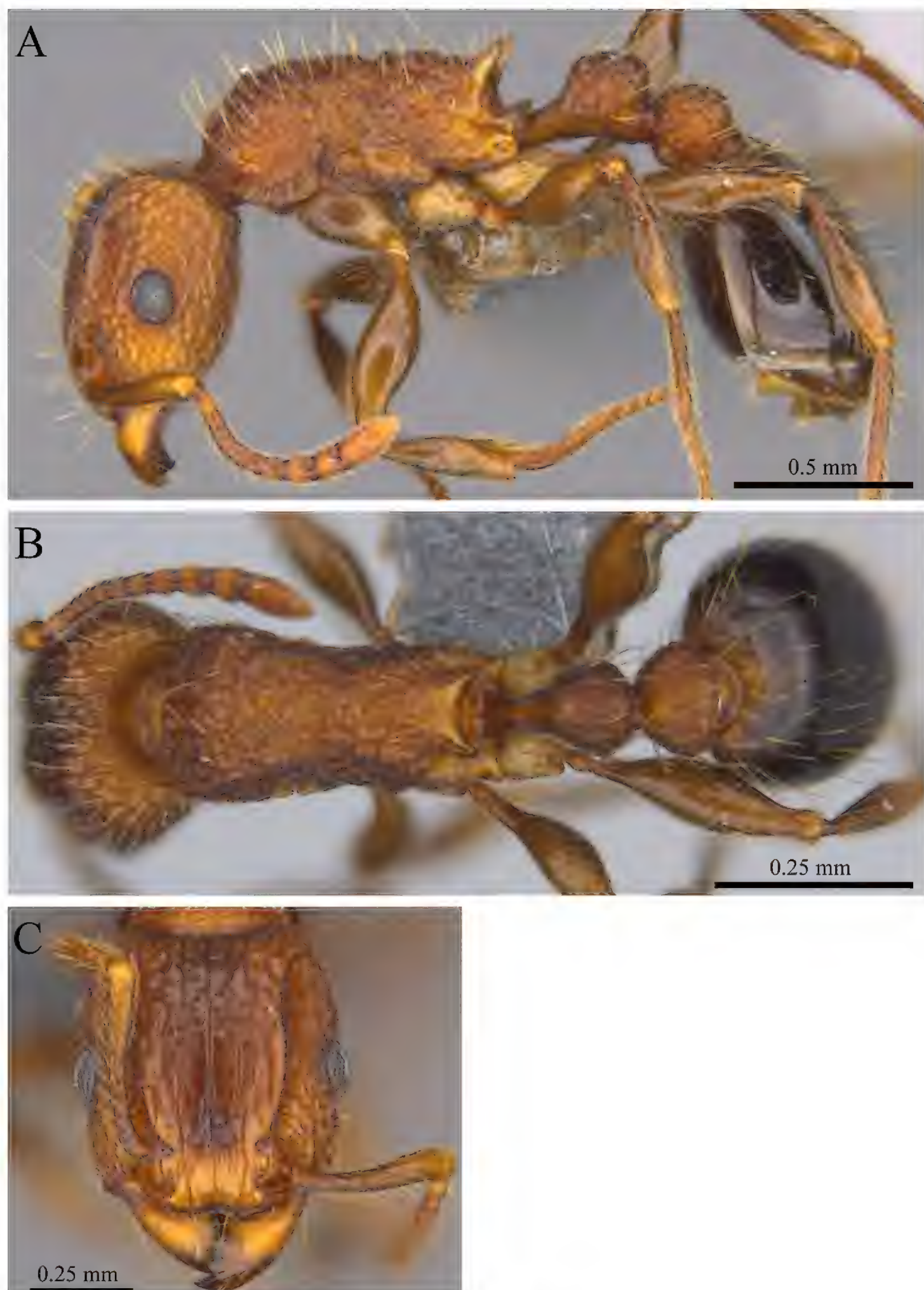
Tetramorium sp1

Figure 110. *Tetramorium* sp. clm01 worker (MCZ-ENT00759754) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



Tetramorium sp2

Figure 111. *Tetramorium* sp. clm02 worker (MCZ-ENT00763454) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



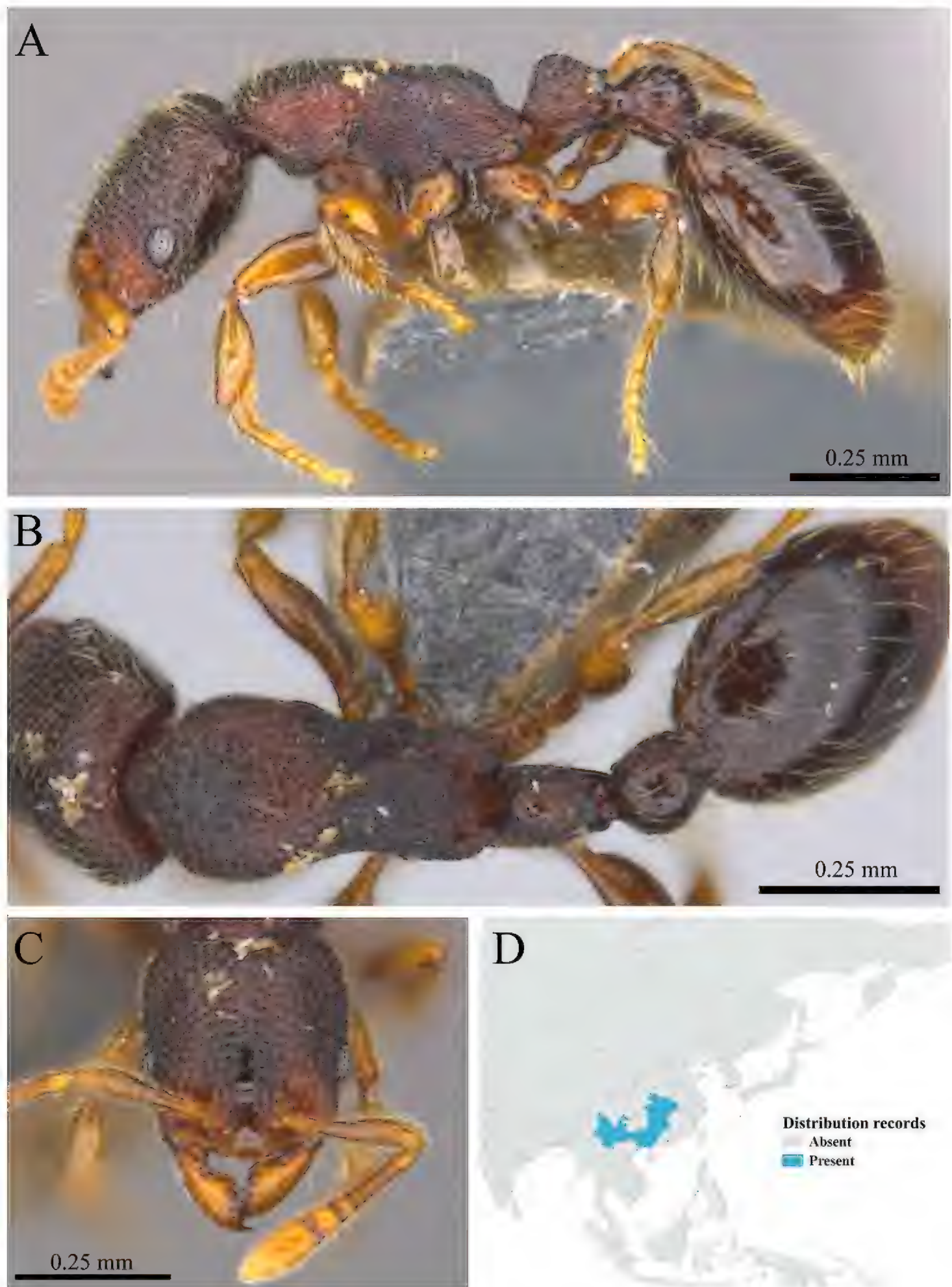
Tetramorium sp3

Figure 112. *Tetramorium* sp. clm03 worker (MCZ-ENT00760040) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



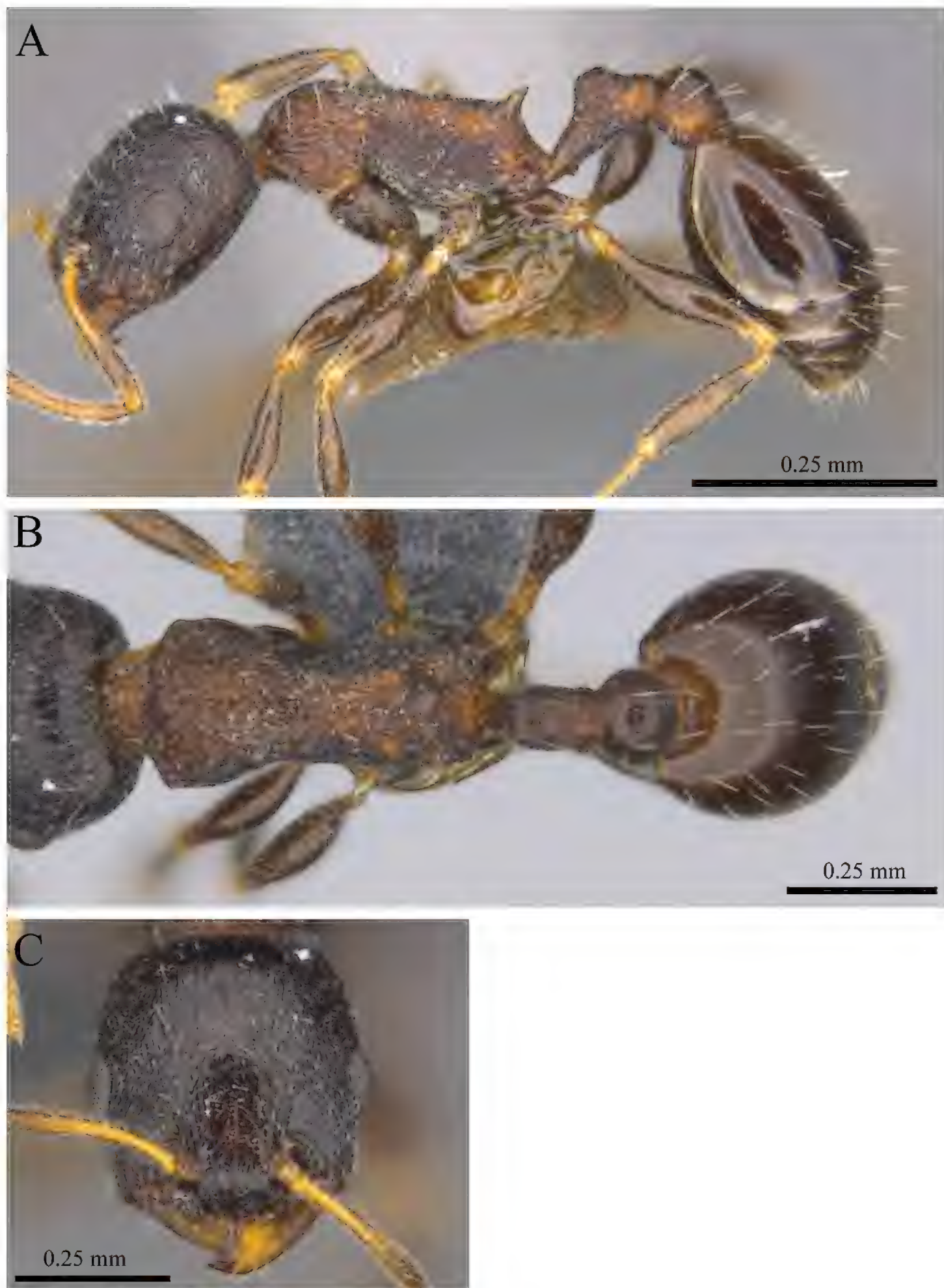
Tetramorium sp4

Figure 113. *Tetramorium* sp. clm04 worker (MCZ-ENT00759856) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



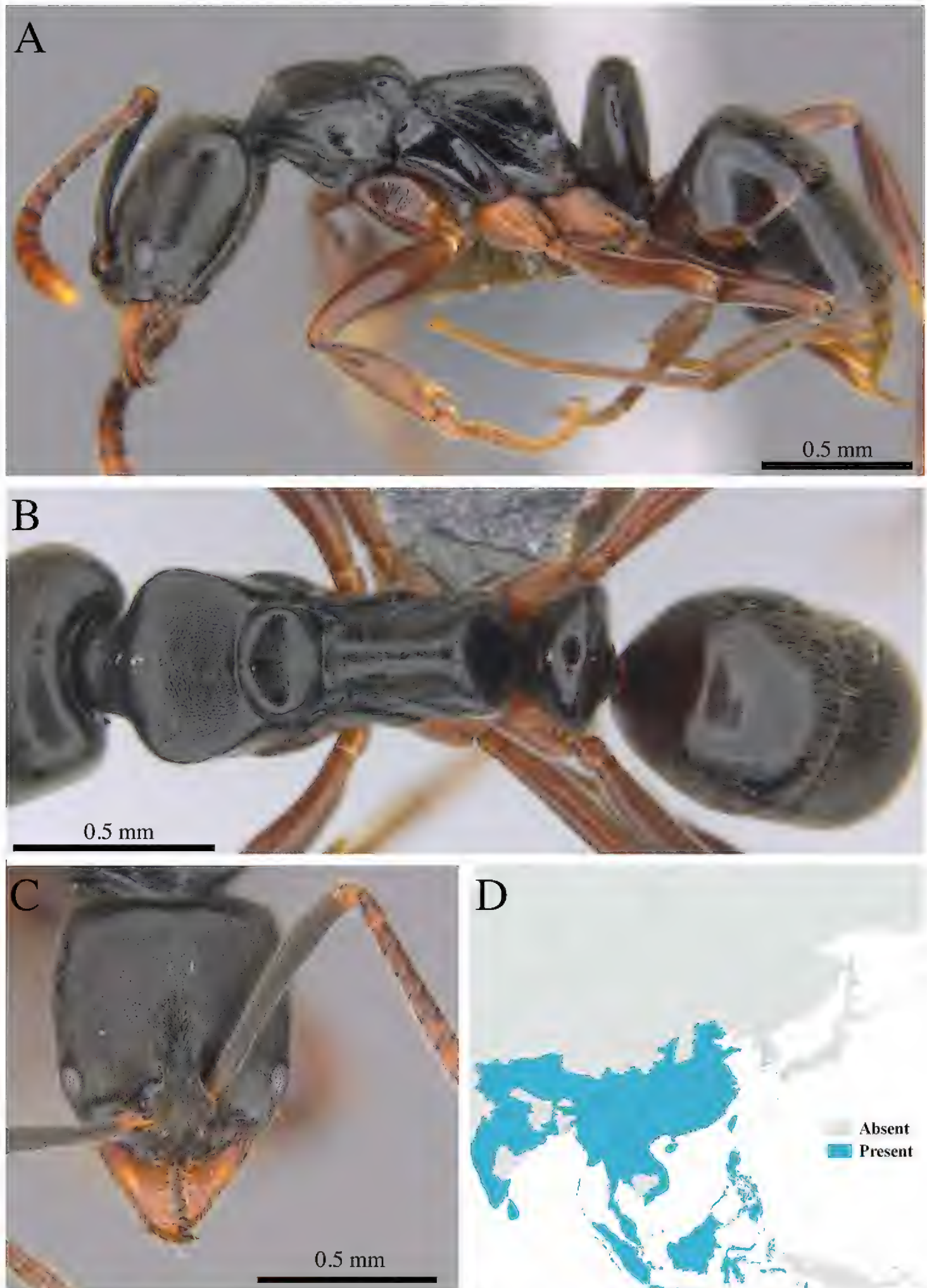
Vollenhovia pyrrhoria

Figure 114. *Vollenhovia pyrrhoria* worker (MCZ-ENT00759854) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



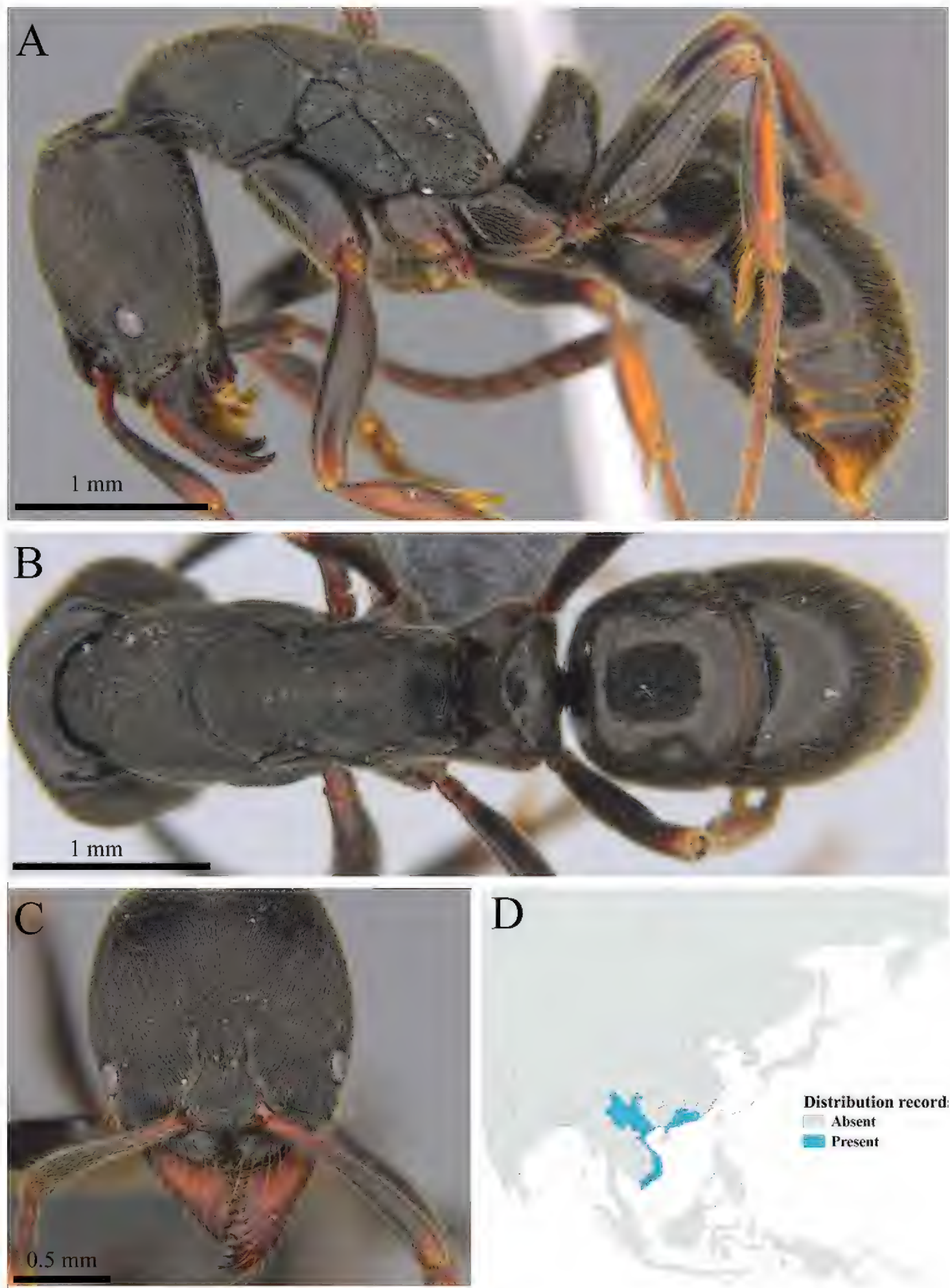
Vollenhovia sp3

Figure 115. *Vollenhovia* sp. clm03 worker (MCZ-ENT00764617) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



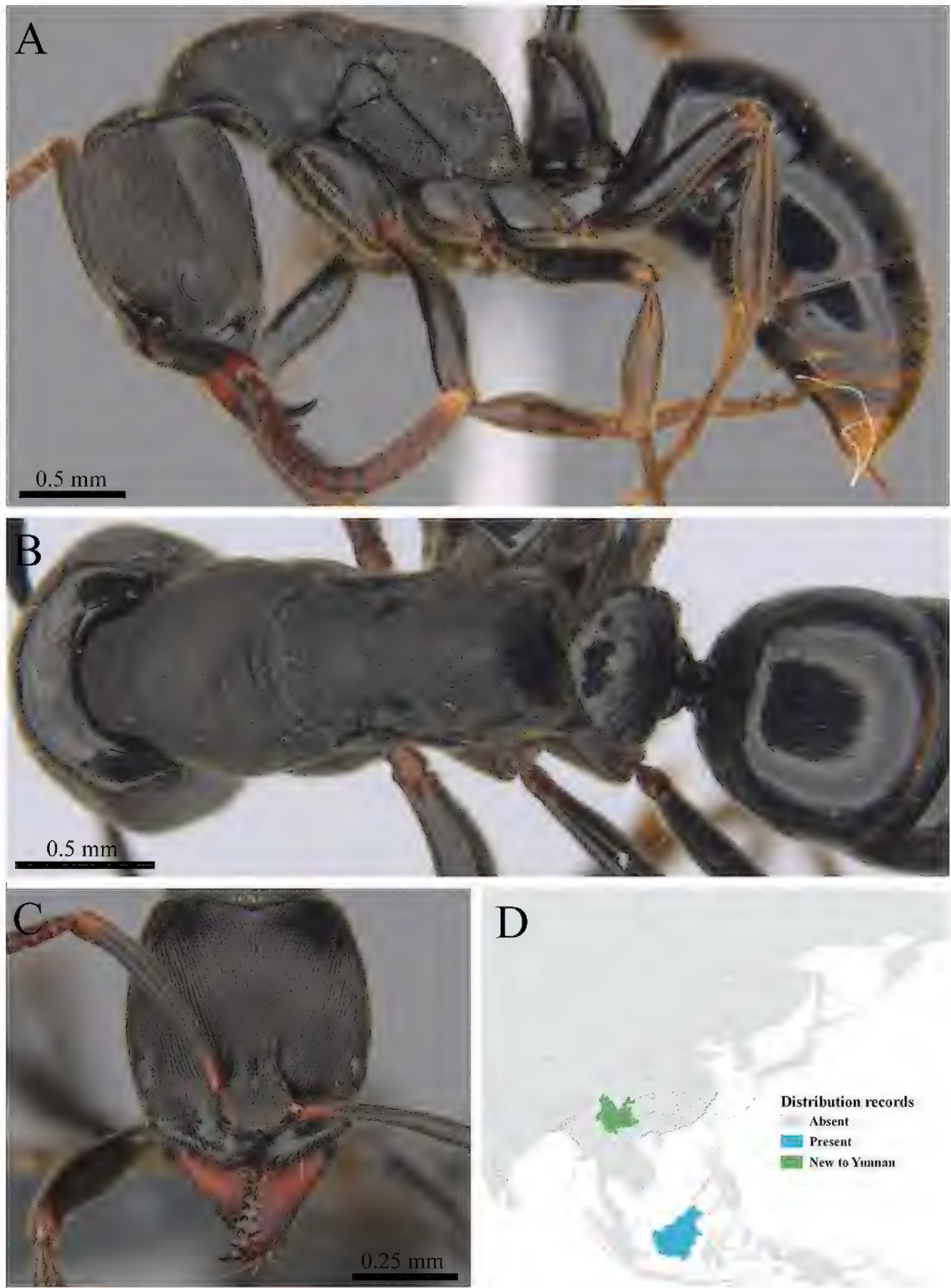
Brachyponera luteipes

Figure 116. *Brachyponera luteipes* worker (MCZ-ENT00759752) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



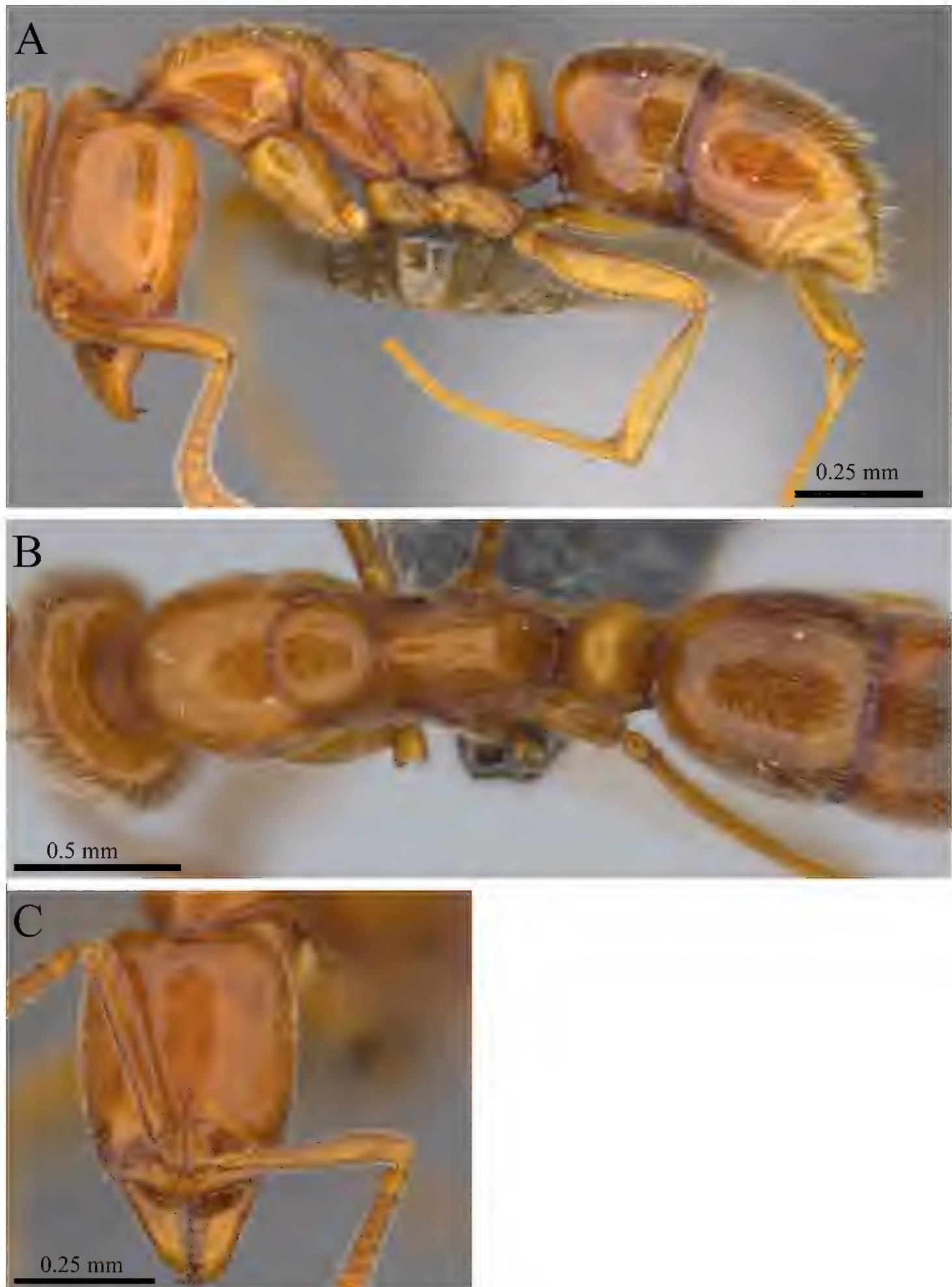
Ectomomyrmex lobocarens

Figure 117. *Ectomomyrmex lobocarens* worker (MCZ-ENT00759748) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



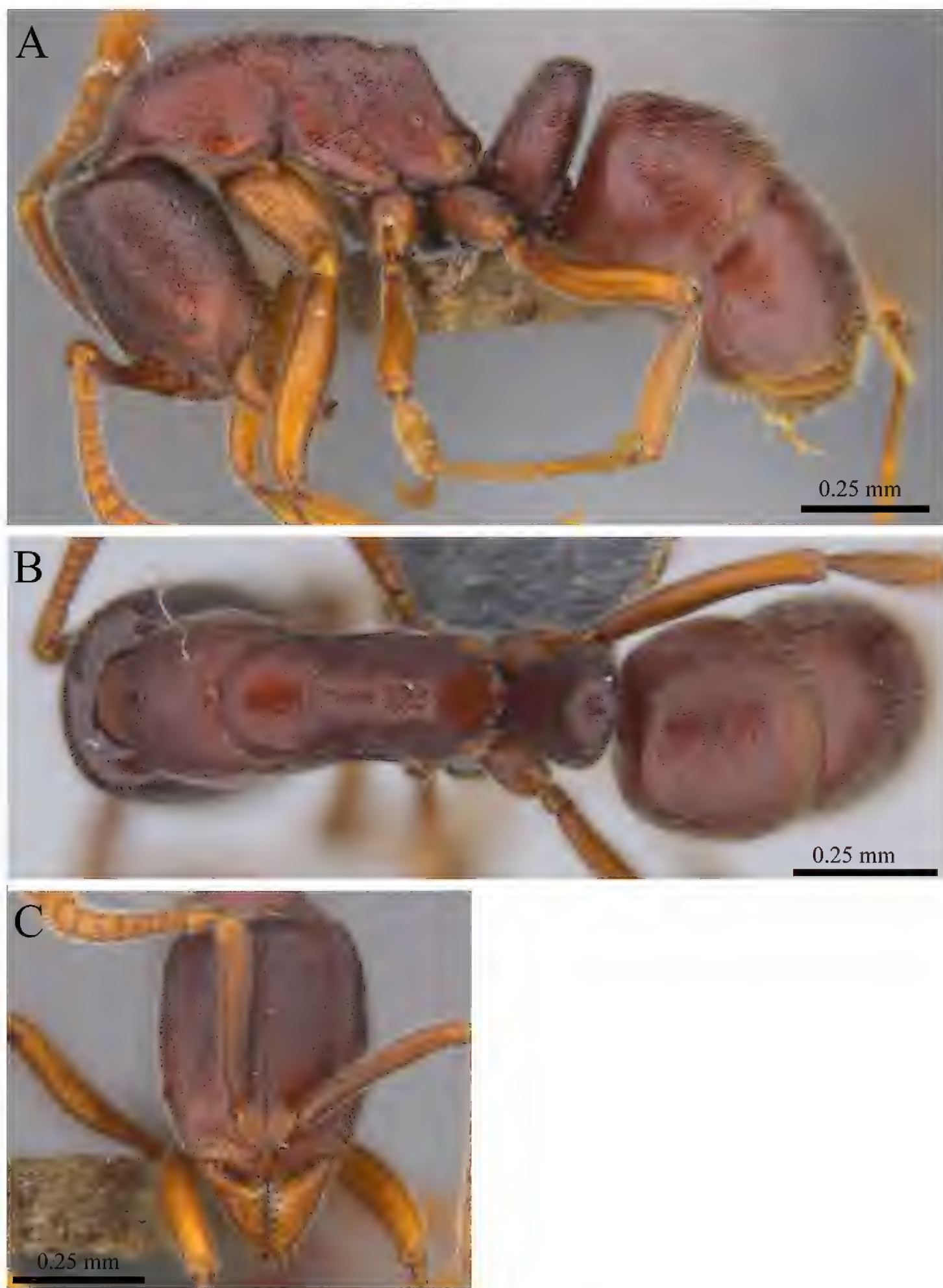
Ectomomyrmex obtusus

Figure 118. *Ectomomyrmex obtusus* worker (MCZ-ENT00759859, new to China) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



Hypoponera sp1

Figure 119. *Hypoponera* sp. clm01 worker (MCZ-ENT00759780) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



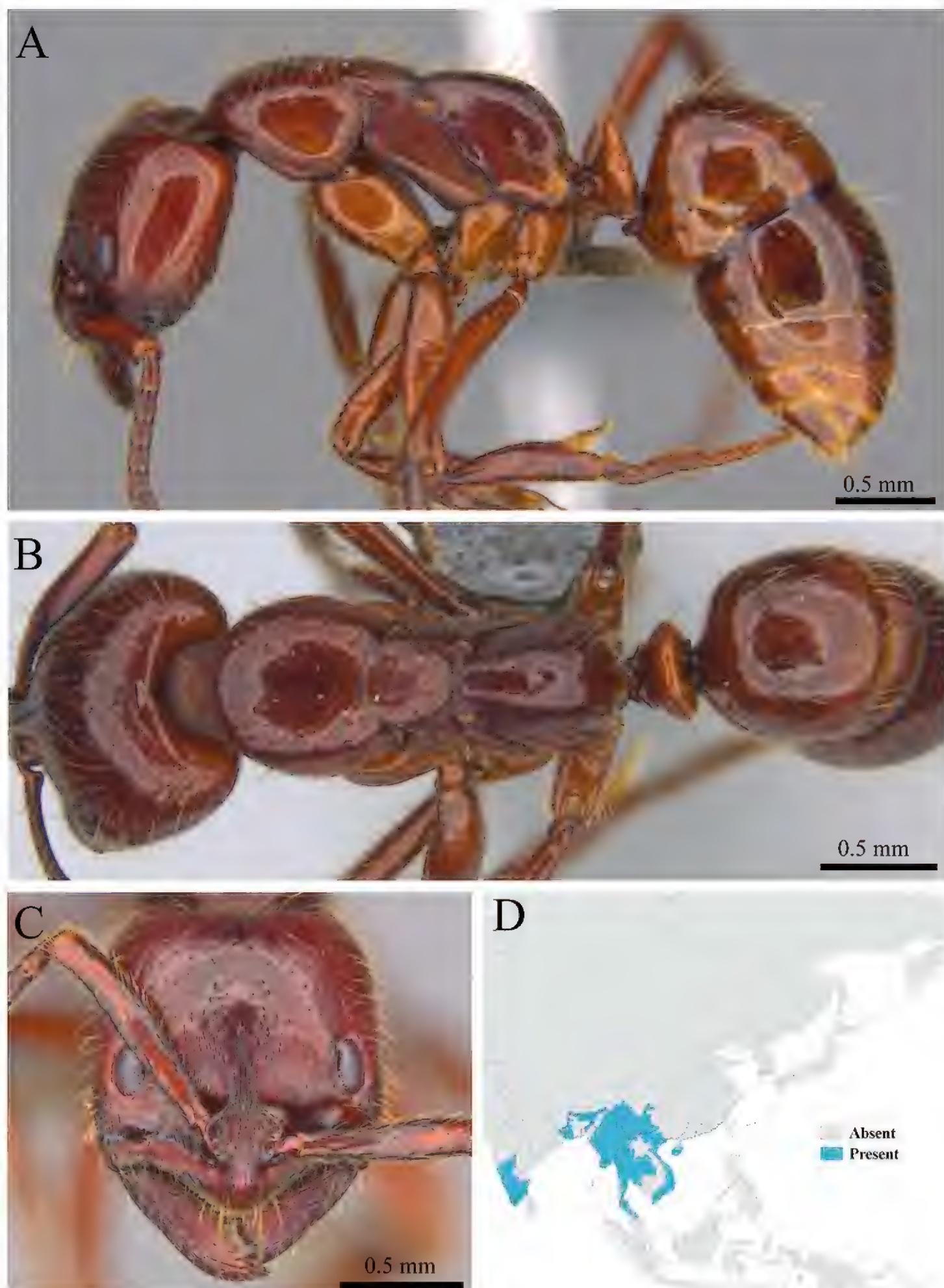
Hypoponera sp2

Figure 120. *Hypoponera* sp. clm02 worker (MCZ-ENT00759849) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



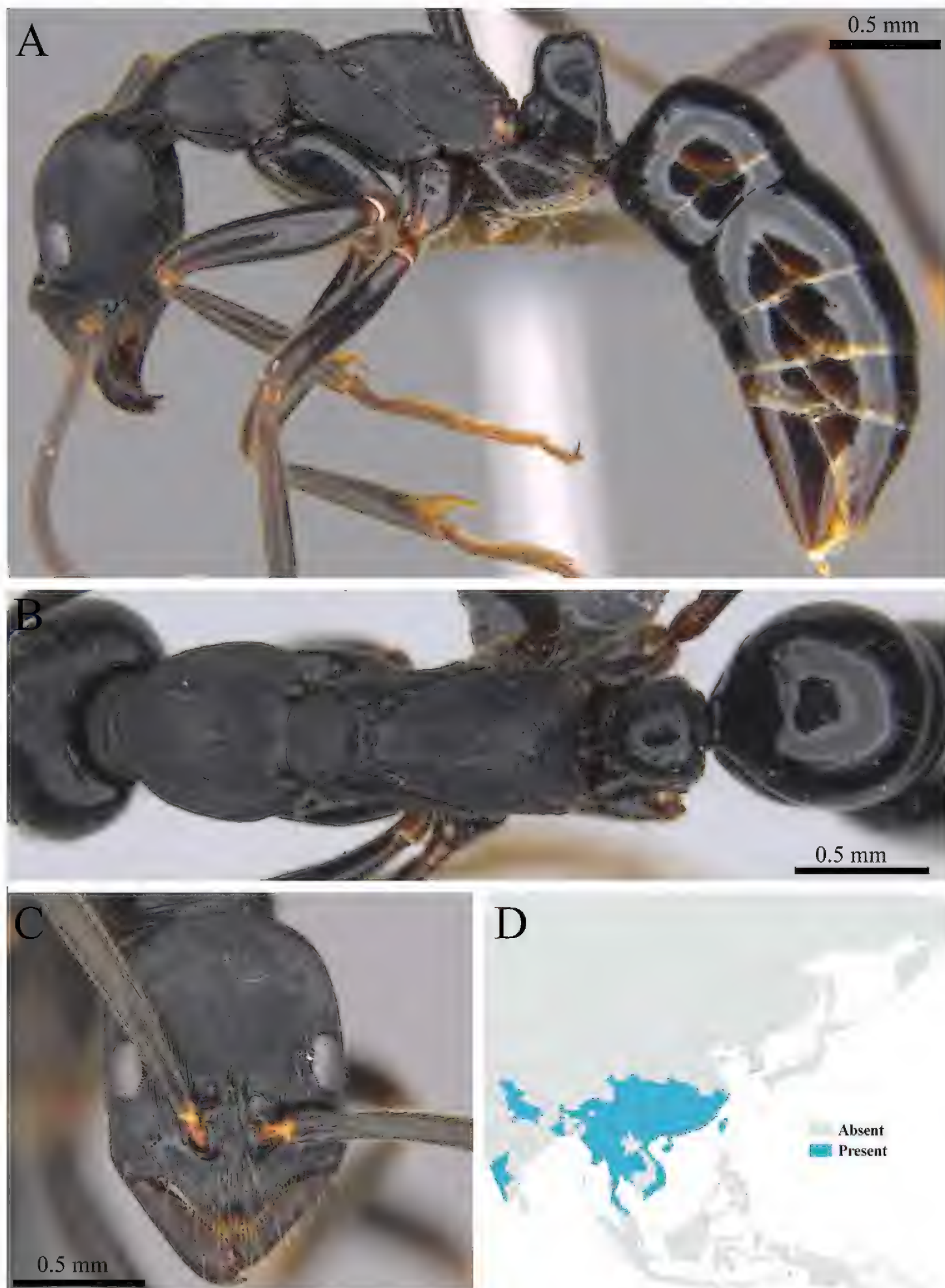
Hypoponera sp3

Figure 121. *Hypoponera* sp. clm03 worker (MCZ-ENT00759808) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view.



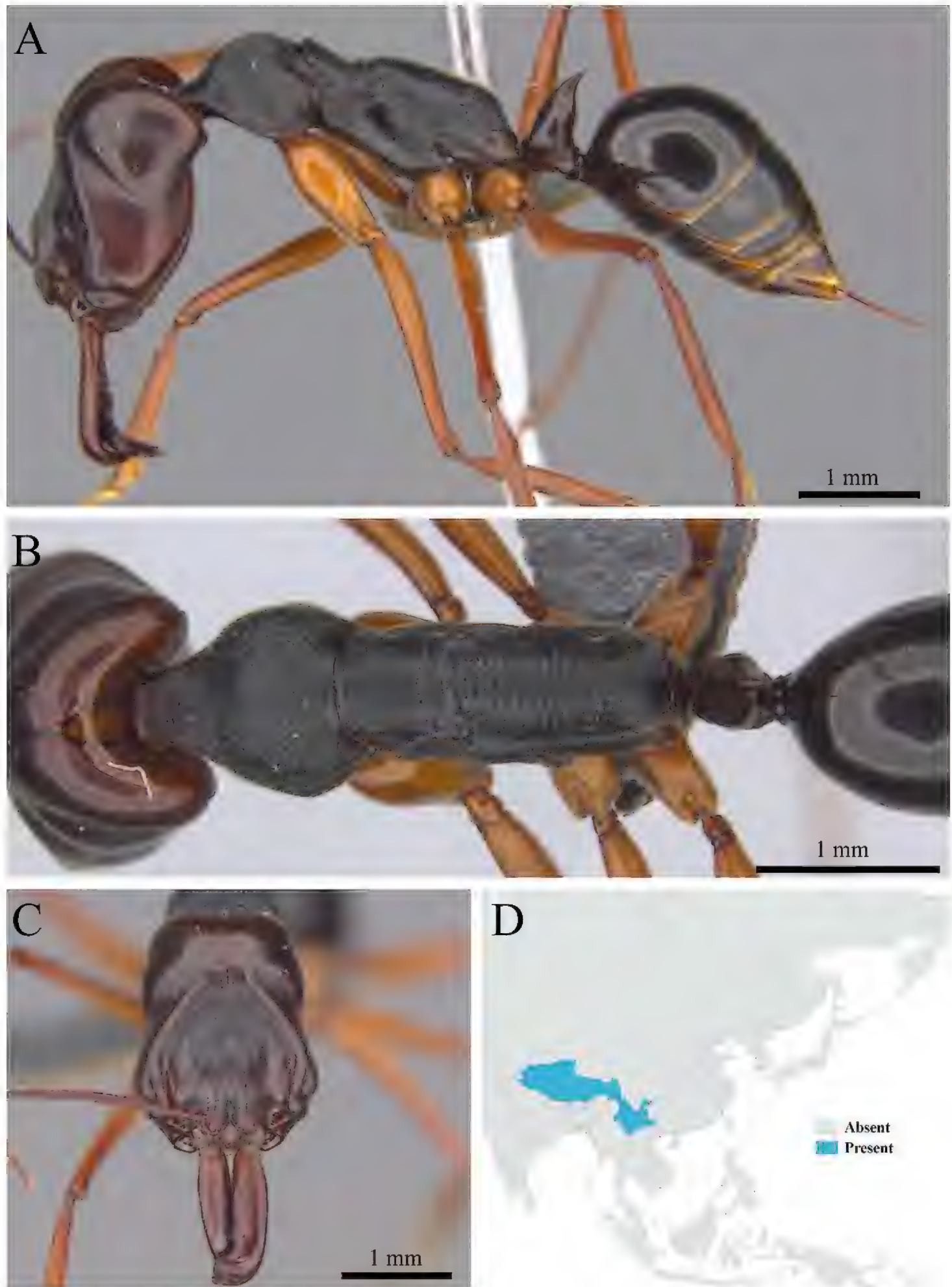
Leptogenys birmana

Figure 122. *Leptogenys birmana* worker (MCZ-ENT00763178) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



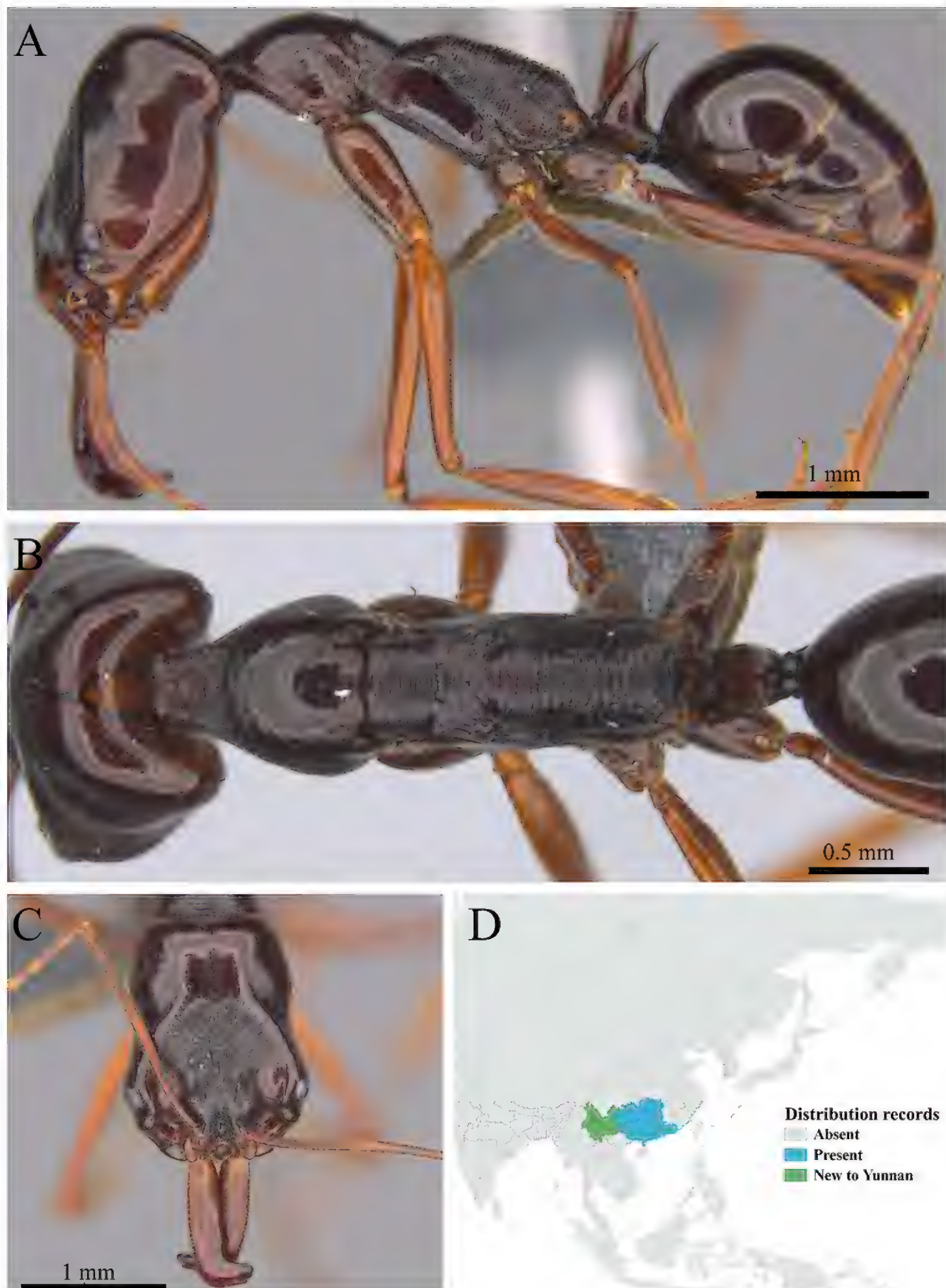
Leptogenys kitteli

Figure 123. *Leptogenys kitteli* worker (MCZ-ENT00763321). **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



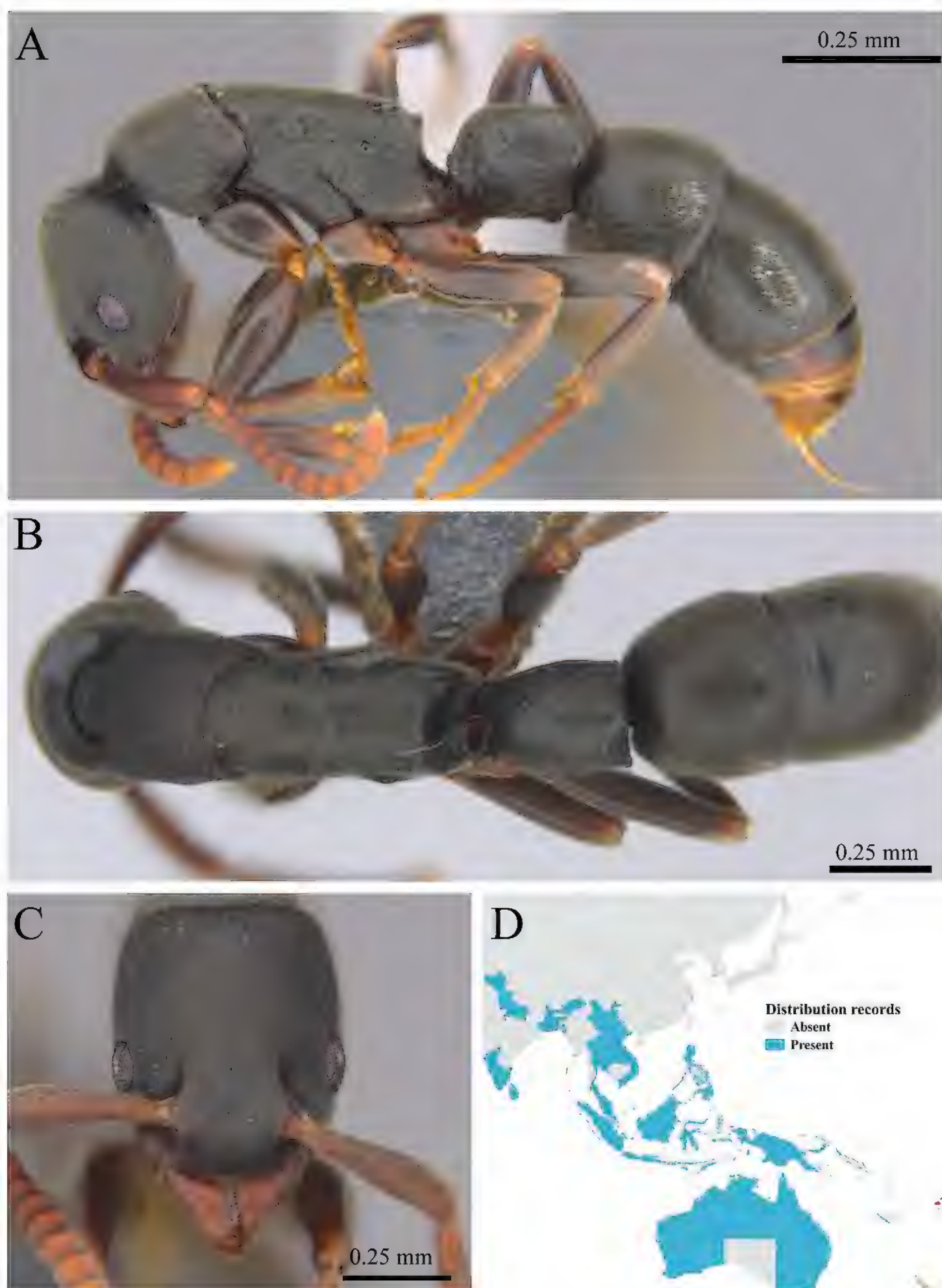
Odontonmachus circulus

Figure 124. *Odontonmachus circulus* worker (MCZ-ENT00762856). **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



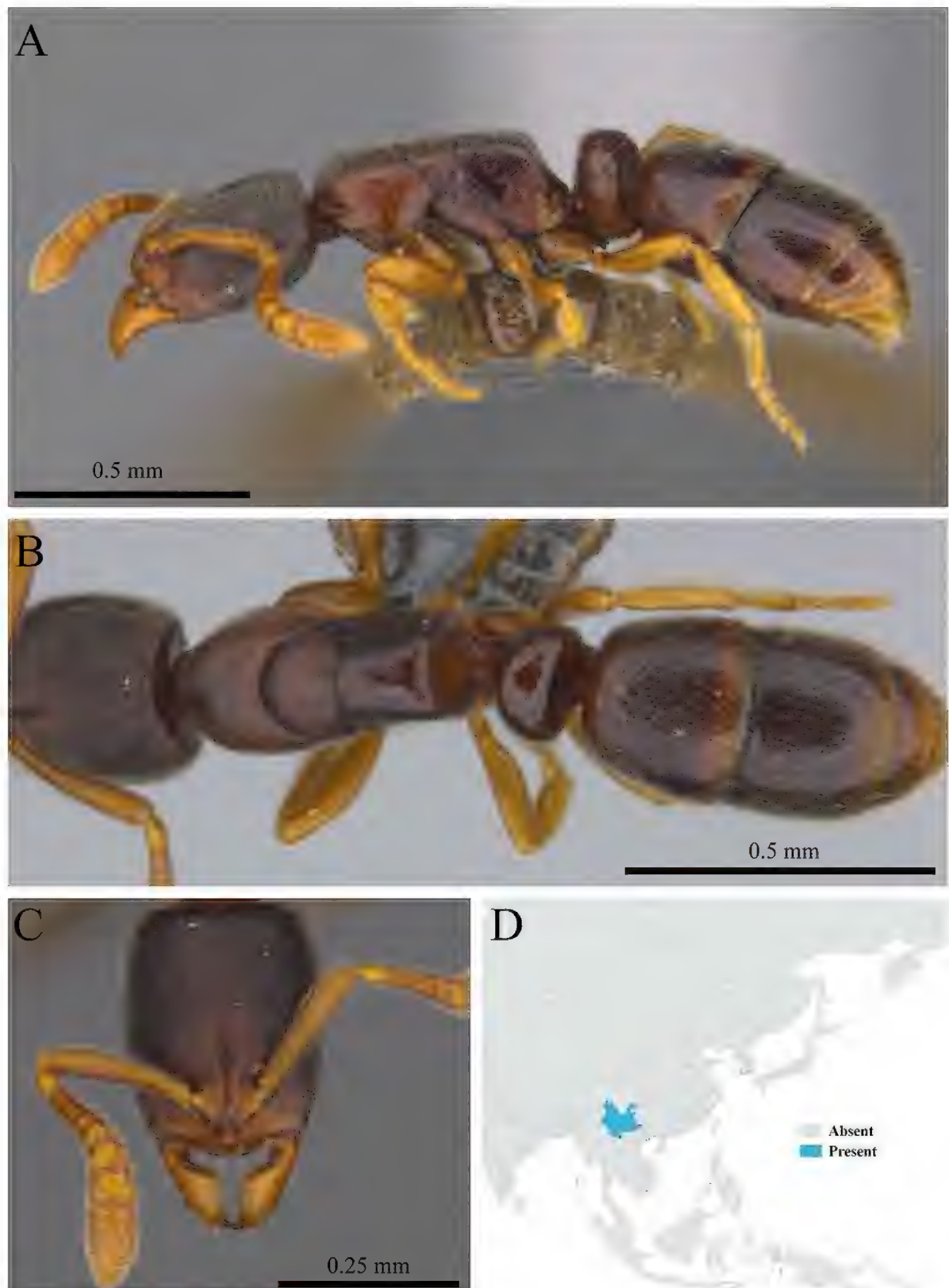
Odontomachus fulgidus

Figure 125. *Odontomachus fulgidus* worker (MCZ-ENT00760009, new to Yunnan) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



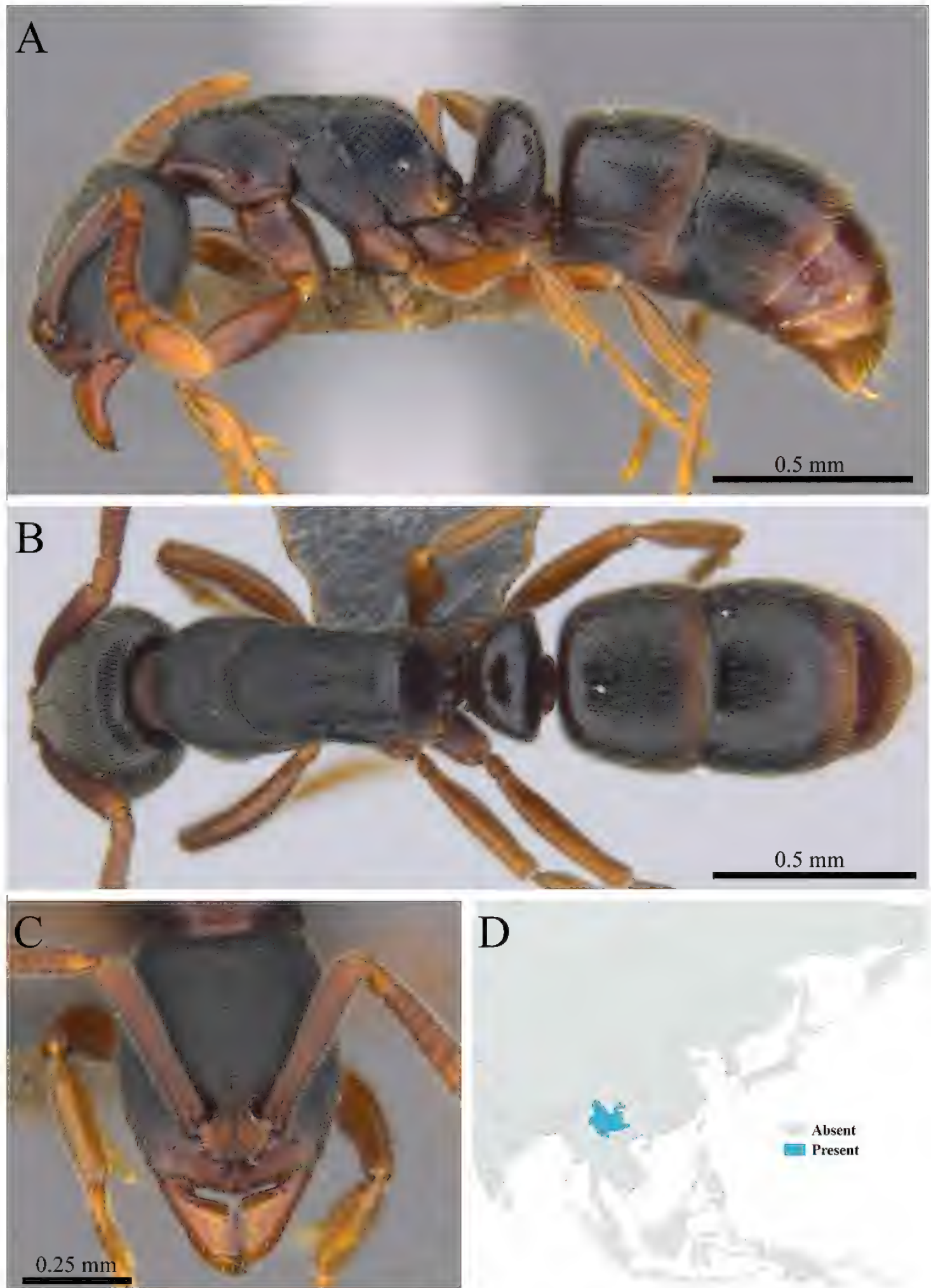
Platythyrea parallela

Figure 126. *Platythyrea parallela* worker (MCZ-ENT00763657) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



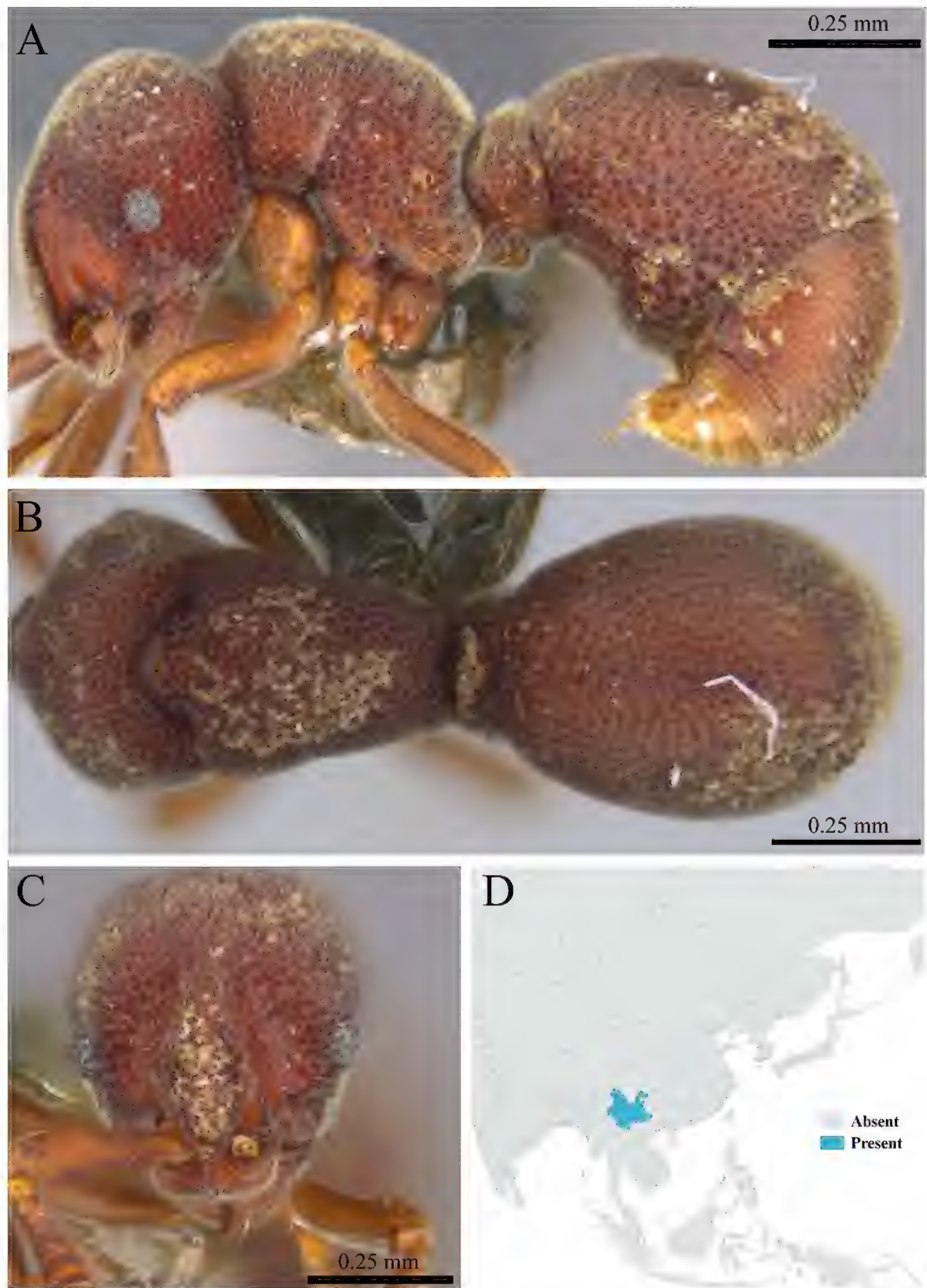
Ponera bawana

Figure 127. *Ponera bawana* worker (MCZ-ENT00759807) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



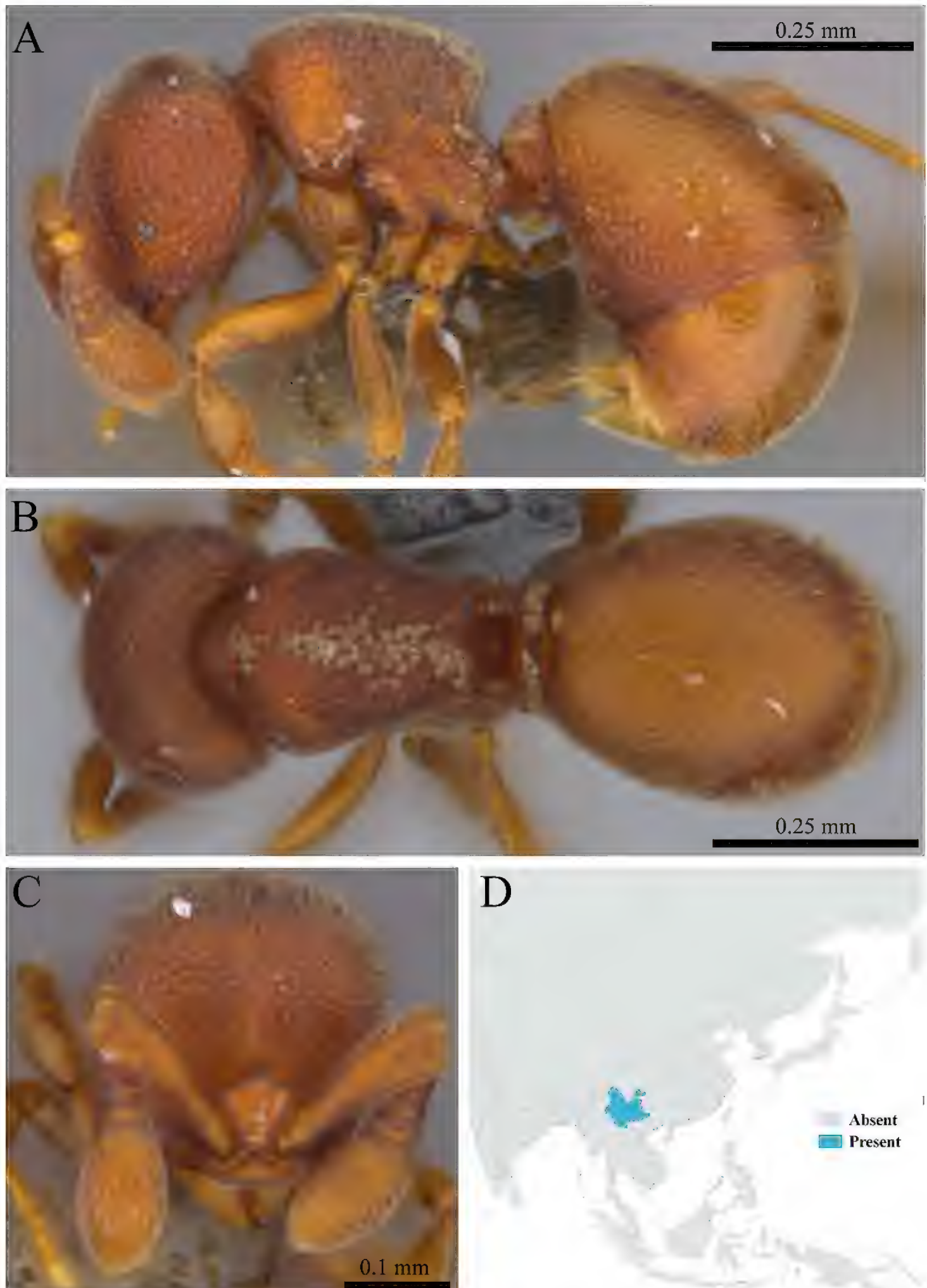
Ponera xantha

Figure 128. *Ponera xantha* worker (MCZ-ENT00759845) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



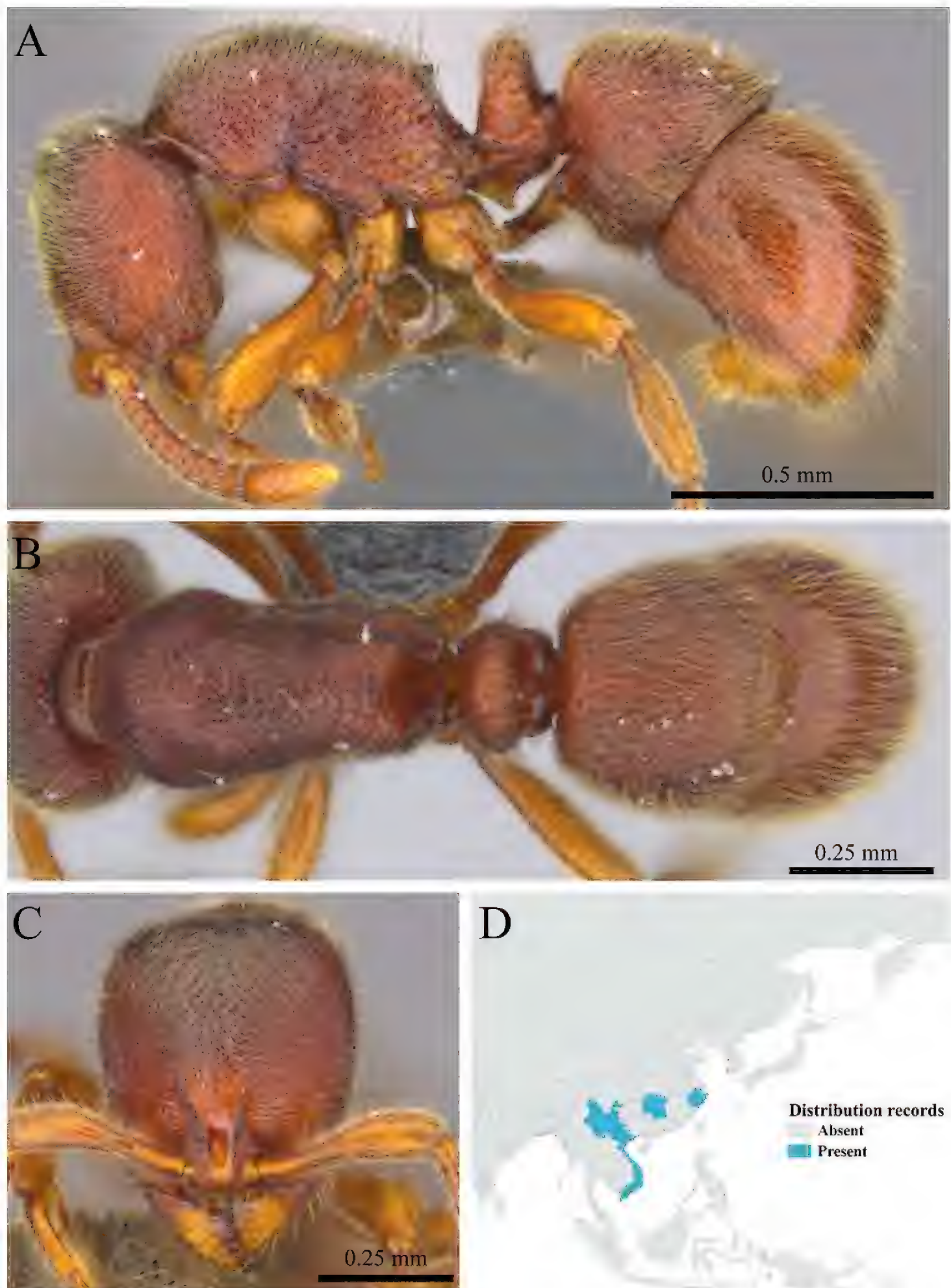
Discothyrea banna

Figure 129. *Discothyrea banna* worker (MCZ-ENT00759809) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



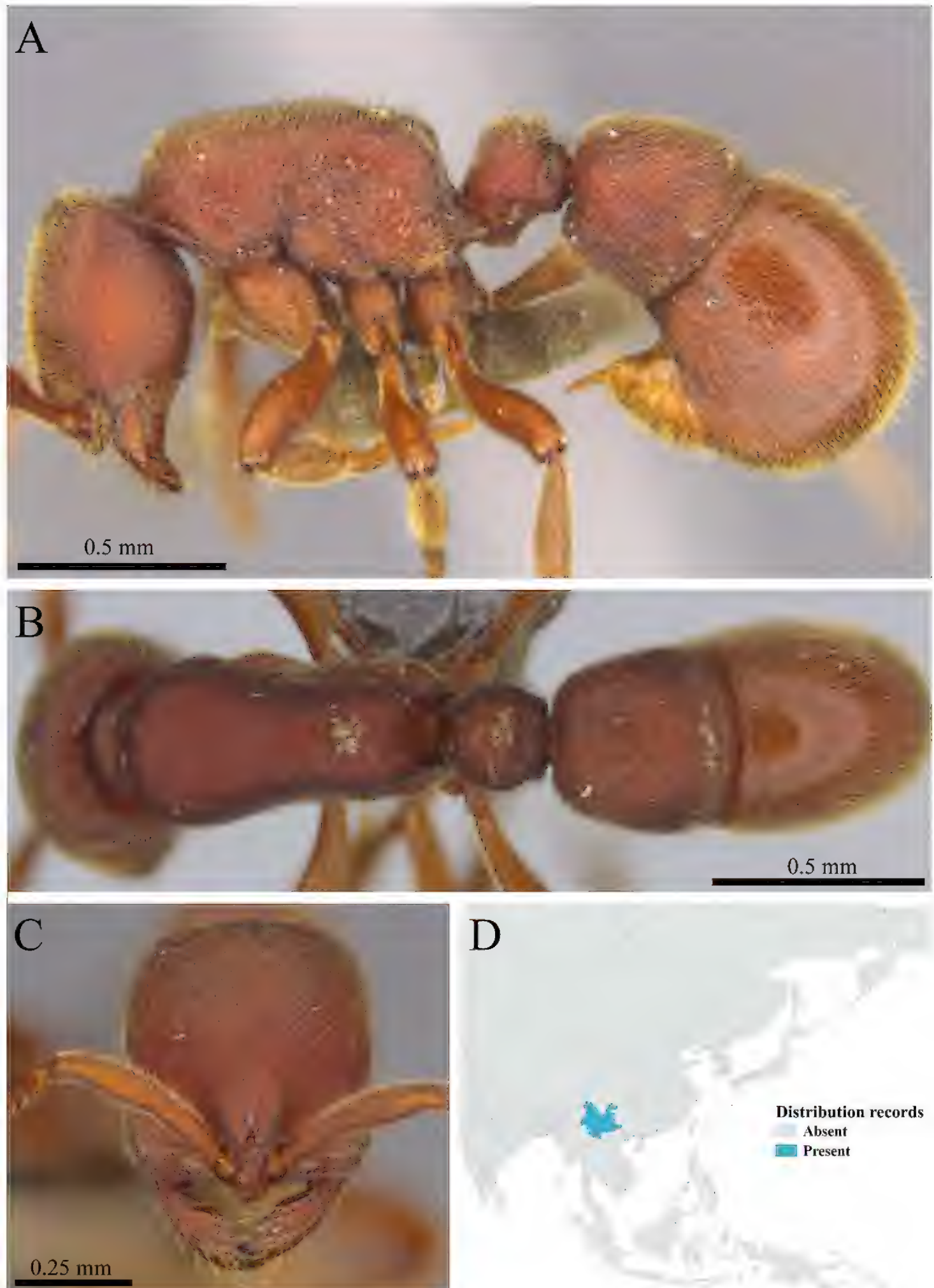
Discothyrea dina

Figure 130. *Discothyrea dina* worker (MCZ-ENT00759806) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



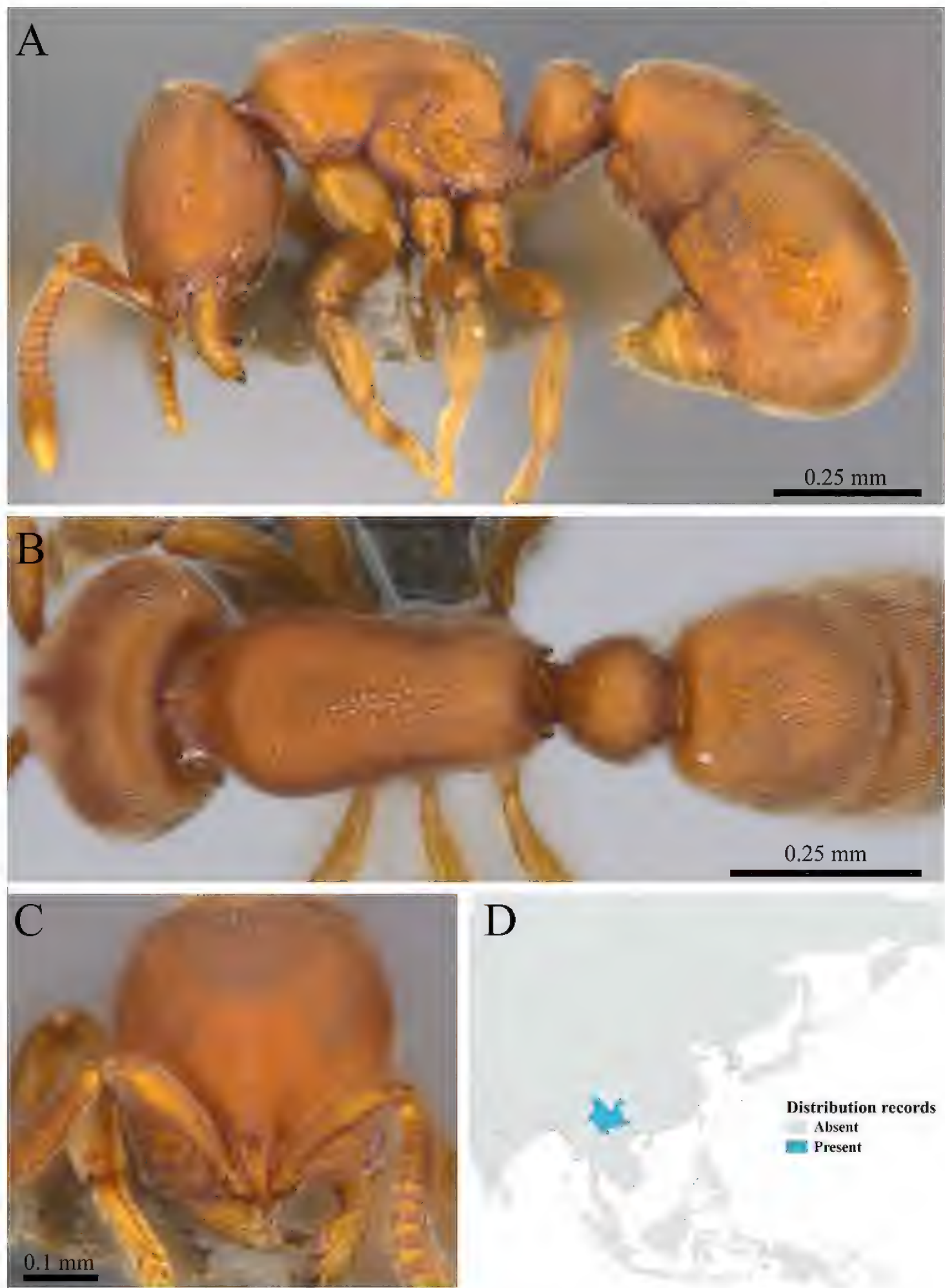
Proceratium longigaster

Figure 131. *Proceratium longigaster* worker (MCZ-ENT00759931) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



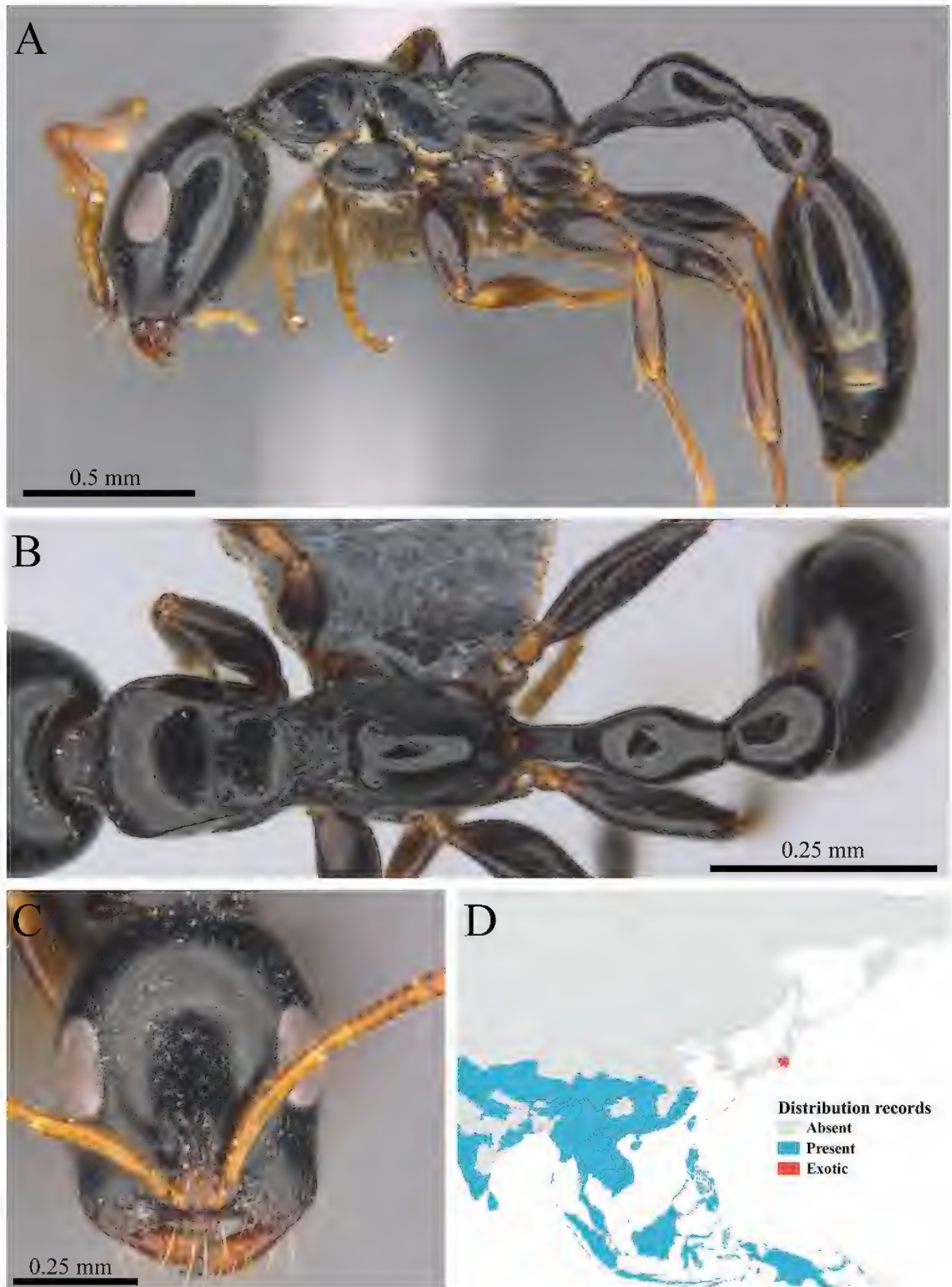
Proceratium longmenense

Figure 132. *Proceratium longmenense* worker (MCZ-ENT00763325) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



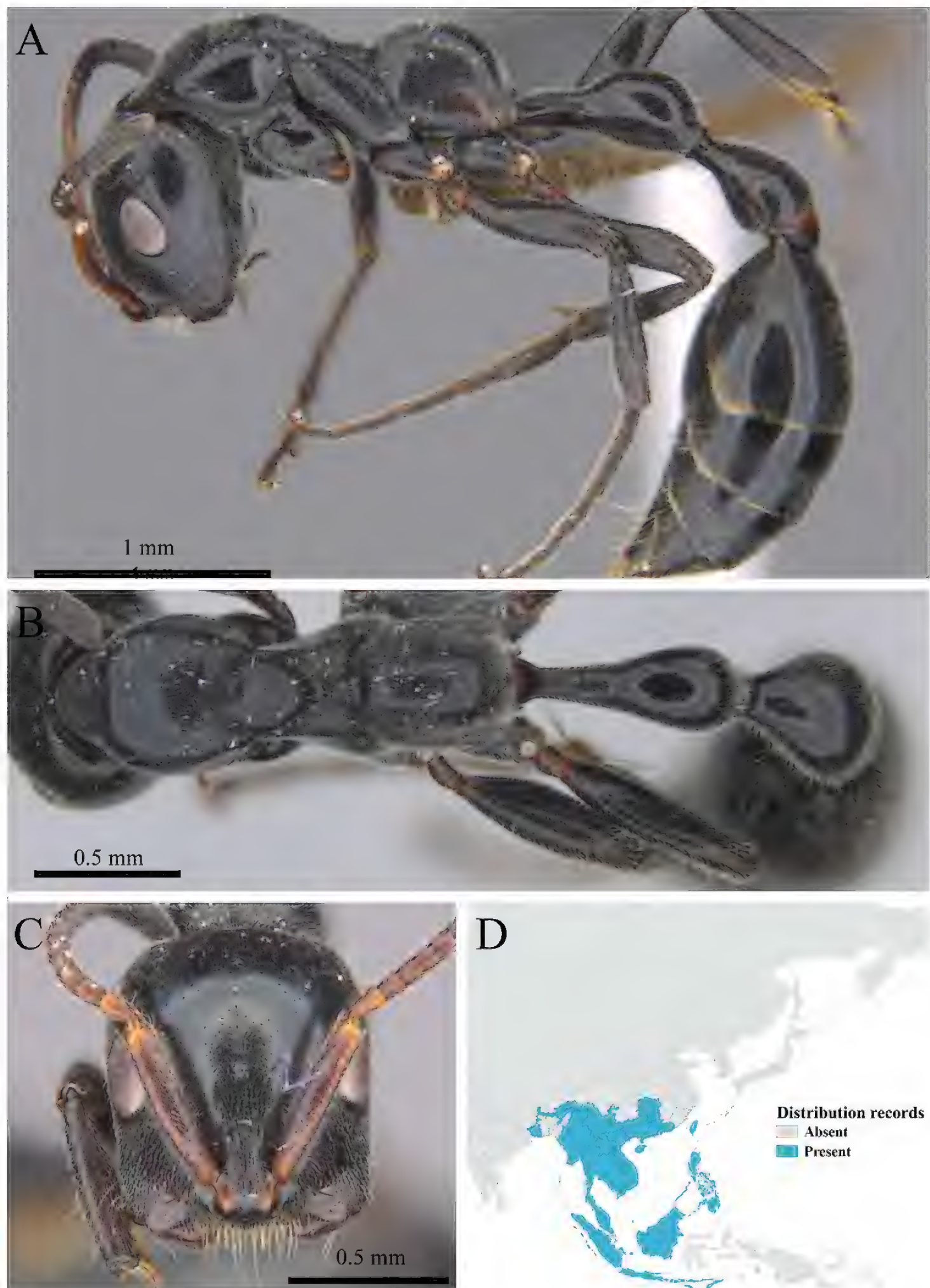
Proceratium zhaoi

Figure 133. *Proceratium zhaoi* worker (MCZ-ENT00759857) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



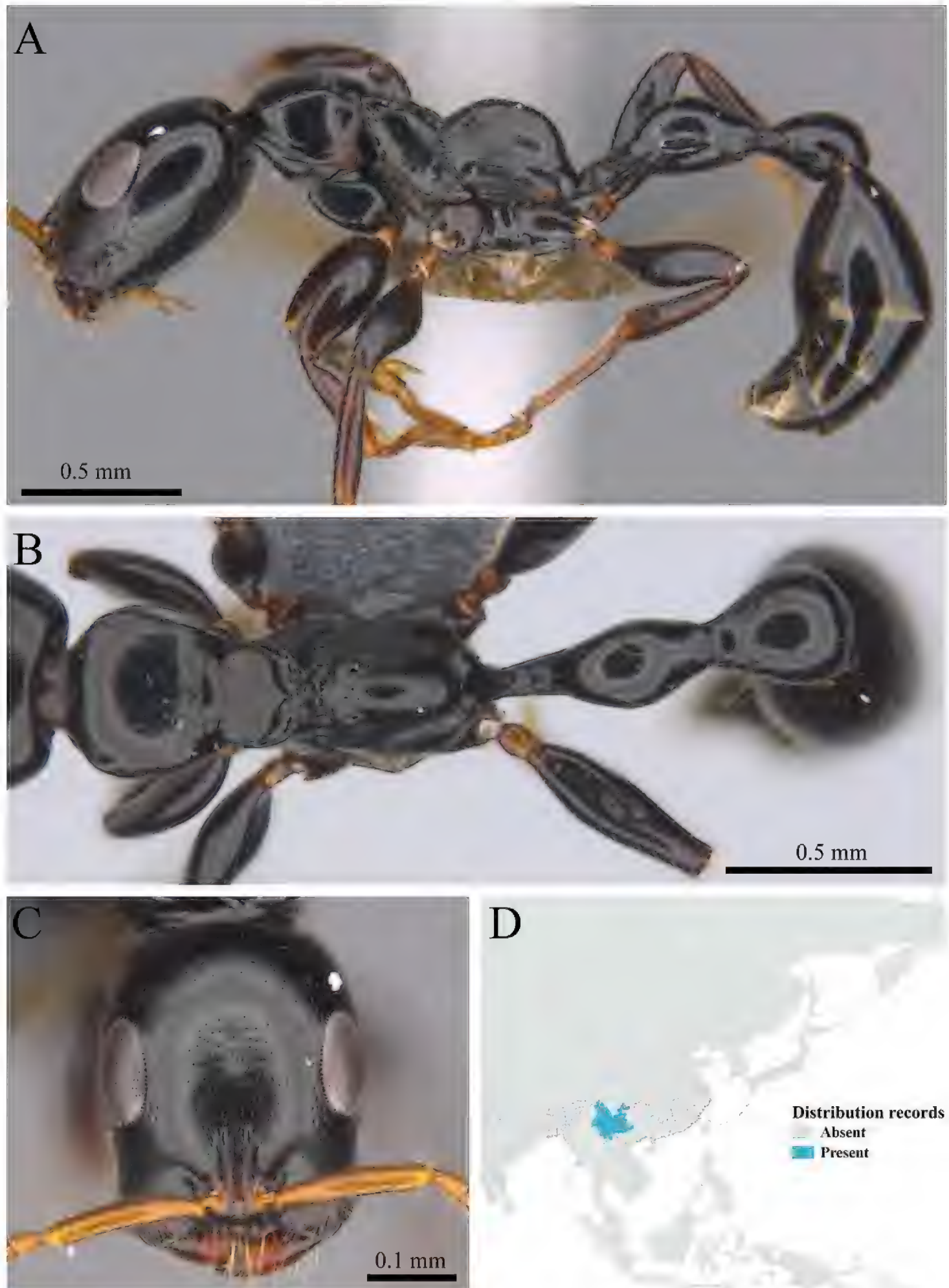
Tetraponera allaborans

Figure 134. *Tetraponera allaborans* worker (MCZ-ENT00763523) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



Tetraponera attenuata

Figure 135. *Tetraponera attenuata* worker (MCZ-ENT00763165) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.



Tetraponera protensa

Figure 136. *Tetraponera protensa* worker (MCZ-ENT00763526) **A** mesosoma in profile view **B** mesosoma in dorsal view **C** head in front view **D** global distribution map.

Yunnan ant list:**AMBLYOPONINAE**

Mystrium: 1 species

Mystrium camillae Emery, 1989

Prionopelta: 1 species (undescribed)

Prionopelta sp.

Stigmatomma: 11 species

* *Stigmatomma amblyops* Karavaiev, 1935

* *Stigmatomma awa* (Xu, 2012)

Stigmatomma crenatum (Xu, 2001)

* *Stigmatomma kangba* (Xu, 2012)

* *Stigmatomma meilianum* (Xu, 2012)

* *Stigmatomma mulanae* (Xu, 2000)

Stigmatomma octodentatum (Xu, 2006)

Stigmatomma rothneyi (Forel, 1900)

* *Stigmatomma scrobiceps* (Guénard, 2013)

Stigmatomma silvestrii (Wheeler, 1928)

Stigmatomma trilobum (Xu, 2001)

DOLICHODERINAE

Chronoxenus: 3 species

Chronoxenus myops (Forel, 1895)

Chronoxenus walshi (Forel, 1895)

Chronoxenus wroughtonii (Forel, 1895)

Dolichoderus: 9 species

Dolichoderus affinis Emery, 1889

Dolichoderus feae Emery, 1889

Dolichoderus incisus Xu, 1995

* *Dolichoderus laotius* Santschi, 1920

Dolichoderus moggridgei Forel, 1886

Dolichoderus sagmanotus Xu, 2001

Dolichoderus squamanodus Xu, 2001

Dolichoderus taprobanae (Smith, 1858)

Dolichoderus thoracicus (Smith, 1860)

Iridomyrmex: 1 species

Iridomyrmex anceps (Roger, 1863)

Liometopum: 1 species

Liometopum sinense Wheeler, 1921

Ochetellus: 1 species

Ochetellus glaber (Mayr, 1862)

Philidris: 1 species

Philidris laevigata (Emery, 1895)

Tapinoma: 4 species

Tapinoma geei Wheeler, 1927

Tapinoma indicum Wheeler, 1895

Tapinoma melanocephalum (Fabricius, 1793)

Tapinoma wroughtonii Forel, 1904

Technomyrmex: 11 species

Technomyrmex albipes (Smith, 1861)

Technomyrmex antennus Zhou, 2001

Technomyrmex bicolor Emery, 1893

Technomyrmex brunneus Forel, 1895

Technomyrmex elatior Forel, 1902

Technomyrmex horni Forel, 1912

* *Technomyrmex kraepelini* Forel, 1905

Technomyrmex obscurior Wheeler, 1928

Technomyrmex pratensis (Smith, 1860)

* *Technomyrmex vitiensis* Mann, 1921

* *Technomyrmex yamanei* Bolton, 2007

DORYLINAE

Aenictus: 19 species

* *Aenictus artipus* Wilson, 1964

Aenictus binghamii Forel, 1900

* *Aenictus brevinodus* Jaitrong & Yamane, 2011

Aenictus ceylonicus (Mayr, 1866)

Aenictus dentatus Forel, 1911

Aenictus feae Emery, 1889

Aenictus fergusonii Forel, 1901

Aenictus grandis Bingham, 1903

Aenictus hodgsoni Forel, 1901

Aenictus laeviceps (Smith, 1857)

* *Aenictus maneerati* Jaitrong & Yamane, 2013

* *Aenictus paradenatus* Jaitrong & Yamane, 2012

Aenictus piercei Wheeler & Chapman, 1930

Aenictus punensis Forel, 1901

Aenictus shuckardi Forel, 1901

Aenictus thailandianus Terayama & Kubota, 1993

* *Aenictus watanasiti* Jaitrong & Yamane, 2013

Aenictus westwoodi Forel, 1901

* *Aenictus yangi* Liu, 2015

***Cerapachys*: 1 species**

Cerapachys sulcinodis Emery, 1889

***Chrysapace*: 1 species**

* *Chrysapace costatus* (Bharti & Wachkoo, 2013)

***Dorylus*: 3 species**

Dorylus laevigatus (Smith, 1857)

Dorylus orientalis Westwood, 1835

Dorylus vishnui Wheeler, 1913

***Lioponera*: 1 species**

Lioponera longitarsus (Mayr, 1879)

***Ooceraea*: 1 species**

Ooceraea biroii (Forel, 1907)

***Parasyscia*: 1 species**

Parasyscia fossulata (Forel, 1895)

Simopone: 1 species

* *Simopone yunnanensis* Chen, 2015

Syscia: 1 species

Syscia typhla Roger, 1861

Yunodorylus: 1 species

Yunodorylus sexspinus Xu, 2000

ECTATOMMINAE

Gnamptogenys: 6 species

Gnamptogenys bicolor (Emery, 1889)

Gnamptogenys coccina Zhou, 2001

* *Gnamptogenys coxalis* (Roger, 1860)

* *Gnamptogenys quadrutinodules* Chen, 2017

Gnamptogenys sichuanensis Lattke, 2004

* *Gnamptogenys sinensis* Wu & Xiao, 1987

* *Gnamptogenys treta* Lattke, 2004

FORMICINAE

Acropyga: 2 species

Acropyga nipponensis Terayama, 1985

Acropyga yaeyamensis Terayama & Hashimoto, 1996

Anoplolepis: 1 species

Anoplolepis gracilipes (Smith, 1857)

Camponotus: 28 species

Camponotus albosparsus Bingham, 1903

Camponotus anningensis Wu & Wang, 1989

Camponotus auratiacus Zhou, 2001

Camponotus barbatus taylori Forel, 1892

* *Camponotus bellus leucodiscus* Wheeler, 1919

* *Camponotus binghamii* Forel, 1894

Camponotus chongqingensis Wu & Wang, 1989

Camponotus compressus (Fabricius, 1787)
Camponotus confucii Forel, 1894
Camponotus cornis Wang & Wu, 1994
* *Camponotus crassisquamis* Forel, 1902
Camponotus dolendus Forel, 1892
Camponotus exiguoguttatus Forel, 1886
* *Camponotus fuscivillosus* Xiao & Wang, 1989
Camponotus holosericeus Emery, 1889
* *Camponotus invidus* Forel, 1892
* *Camponotus itoi* Forel, 1912
Camponotus japonicus Mayr, 1866
Camponotus jianghuaensis Xiao & Wang, 1989
Camponotus lasiselene Wang & Wu, 1994
Camponotus minus Wang & Wu, 1994
Camponotus mitis (Smith, 1858)
Camponotus nicobarensis Mayr, 1865
Camponotus parius Emery, 1889
Camponotus pseudoirritans Wu & Wang, 1989
Camponotus pseudolendus Wu & Wang, 1989
* *Camponotus radiatus* Forel, 1892
Camponotus siemsseni Forel, 1901
Camponotus singularis (Smith, 1858)
Camponotus tonkinus Santschi, 1925
Camponotus vitiosus (Smith, 1874)

Colobopsis: 7 species

Colobopsis badia (Smith, 1857)
* *Colobopsis ceylonica* (Emery, 1925)
Colobopsis cotesii (Forel, 1893)
Colobopsis leonardi (Emery, 1889)
Colobopsis politae (Wu & Wang, 1994)
Colobopsis rothneyi (Forel, 1893)
Colobopsis vitrea (Smith, 1860)

Echinopla: 2 species

* *Echinopla cherapunjiensis* Bharti & Gul, 2012
* *Echinopla striata* Smith, 1857

Formica: 5 species

Formica cunicularia Latreille, 1798

- * *Formica gagatoides* Ruzsky, 1904
- Formica glabridorsis* Santschi, 1925
- * *Formica lemani* Bondroit, 1917
- Formica japonica* Motschoulsky, 1866
- Formica sanguinea* Latreille, 1798
- Formica sinensis* Wheeler, 1913

Gesomyrmex: 1 species

- * *Gesomyrmex kalshoveni* Wheeler, 1929

Lasius: 6 species

- Lasius draco* Collingwood, 1982
- Lasius flavus* (Fabricius, 1782)
- * *Lasius himalayanus* Bingham, 1903
- Lasius nipponensis* Forel, 1912
- * *Lasius obscuratus* Stitz, 1930
- Lasius sichuense* Seifert, 2020

Lepisiota: 8 species

- Lepisiota acuta* Xu, 1994
- Lepisiota capensis* (Mayr, 1862)
- Lepisiota opaca* (Forel, 1892)
- * *Lepisiota pulchella* (Forel, 1892)
- Lepisiota reticulata* Xu, 1994
- Lepisiota rothneyi* (Forel, 1894)
- Lepisiota rothneyi wroughtonii* (Forel, 1902)
- Lepisiota xichangensis* (Wu & Wang, 1995)

Myrmoteras: 2 species

- Myrmoteras binghamii* Forel, 1893
- Myrmoteras cuneonodus* Xu, 1998

Nylanderia: 10 species

- Nylanderia birmana* (Forel, 1902)
- Nylanderia bourbonica* (Forel, 1886)
- * *Nylanderia emmae* (Forel, 1894)
- * *Nylanderia flaviabdominis* (Wang, 1997)
- Nylanderia flavipes* (Smith, 1874)

Nylanderia indica (Forel, 1894)
Nylanderia sharpii (Forel, 1899)
Nylanderia taylori (Forel, 1894)
Nylanderia vividula (Nylander, 1846) (**Exotic**)
Nylanderia yerburyi (Forel, 1894)

***Oecophylla*: 1 species**

Oecophylla smaragdina (Fabricius, 1775)

***Paraparatrechina*: 2 species**

* *Paraparatrechina sakurae* (Ito, 1914)
Paraparatrechina sauteri (Forel, 1913)

***Paratrechina*: 1 species**

Paratrechina longicornis (Latreille, 1802) (**Exotic**)

***Plagiolepis*: 4 species**

Plagiolepis alluaudi Emery, 1894 (**Exotic**)
Plagiolepis demangei Santschi, 1920
Plagiolepis exigua Forel, 1894
* *Plagiolepis jerdonii* Forel, 1894

***Polyrhachis*: 32 species**

Polyrhachis armata (Le Guillou, 1842)
Polyrhachis bakana Xu, 1998
Polyrhachis bicolor Smith, 1858
Polyrhachis bihamata (Drury, 1773)
Polyrhachis brevicorpa Xu, 2002
Polyrhachis burmanensis Donisthorpe, 1938
Polyrhachis cornihumera Xu, 2002
Polyrhachis cornuhumera Zhou & Huang, 2002
Polyrhachis cyphonota Xu, 1998
Polyrhachis dentihumera Xu, 2002
Polyrhachis dives Smith, 1857
* *Polyrhachis exercita* (Walker, 1859)
Polyrhachis furcata Smith, 1858
Polyrhachis gibba Emery, 1901
Polyrhachis halidayi Emery, 1889

- * *Polyrhachis hippomanes* Emery, 1861
- Polyrhachis hippomanes ceylonensis* Emery, 1893
- Polyrhachis illaudata* Walker, 1859
- Polyrhachis jianghuaensis* Wang & Wu, 1991
- Polyrhachis laevigata* Smith, 1857
- Polyrhachis moesta* Emery, 1887
- Polyrhachis orbihumera* Xu, 2002
- Polyrhachis paracamponota* Wang & Wu, 1991
- Polyrhachis proxima* Roger, 1863
- Polyrhachis pubescens* Mayr, 1879
- Polyrhachis punctillata* Roger, 1863
- Polyrhachis rastellata* (Latreille, 1802)
- Polyrhachis rotoccipita* Xu, 2002
- Polyrhachis rufipes* Smith, 1858
- Polyrhachis thompsoni* Bingham, 1903
- Polyrhachis thrinax* Roger, 1863
- Polyrhachis tibialis* Smith, 1858

***Prenolepis*: 7 species**

- Prenolepis angularis* Zhou, 2001
- * *Prenolepis fustinoda* Williams & LaPolla, 2016
- * *Prenolepis mediops* Williams & LaPolla, 2016
- Prenolepis melanogaster* Emery, 1893
- Prenolepis naoroji* Forel, 1902
- * *Prenolepis shanialena* Williams & LaPolla, 2016
- * *Prenolepis striata* Chen & Zhou, 2018

***Pseudolasius*: 6 species**

- Pseudolasius bidenticypeus* Xu, 1997
- Pseudolasius cibdelus* Wu & Wang, 1992
- Pseudolasius emeryi* Forel, 1911
- Pseudolasius familiaris* (Smith, 1860)
- Pseudolasius risii* Forel, 1894
- Pseudolasius silvestrii* Wheeler, 1927

LEPTANILLINAE

***Leptanilla*: 3 species**

- Leptanilla hunanensis* Tang, Li & Chen, 1992
- Leptanilla kunmingensis* Xu & Zhang, 2002

Leptanilla yunnanensis Xu, 2002

Protanilla: 4 species

Protanilla bicolor Xu, 2002

Protanilla concolor Xu, 2002

* *Protanilla furcomandibula* Xu, 2002

Protanilla gengma Xu, 2012

MYRMICINAE

Acanthomyrmex: 2 species

Acanthomyrmex glabfemoralis Zhou & Zheng, 1997

Acanthomyrmex luciolae Emery, 1893

Aphaenogaster: 9 species

Aphaenogaster beccarii Emery, 1887

Aphaenogaster exasperata (Smith, 1921)

Aphaenogaster famelica (Smith, 1874)

Aphaenogaster feae Emery, 1889

* *Aphaenogaster geei* Wheeler, 1921

Aphaenogaster japonica Forel, 1911

Aphaenogaster lepida Wheeler, 1930

Aphaenogaster rothneyi (Forel, 1902)

Aphaenogaster schurri (Forel, 1902)

Aphaenogaster smythiesii (Forel, 1902)

Cardiocondyla: 3 species

* *Cardiocondyla itsukii* Seifert, Okita & Heinze, 2017 (**Exotic**)

Cardiocondyla obscurior Wheeler, 1929

Cardiocondyla wroughtonii (Forel, 1890)

Carebara: 18 species

Carebara acutispina (Xu, 2003)

Carebara affinis (Jerdon, 1951)

Carebara altinoda (Xu, 2003)

Carebara asina (Forel, 1902)

Carebara bengalensis (Forel, 1902)

Carebara bihornata (Xu, 2003)

Carebara curvispina (Xu, 2003)
 * *Carebara diversa* (Jerdon, 1851)
 * *Carebara jiangxiensis* Wu & Wang, 1995
Carebara lignata Westwood, 1840
 * *Carebara melasolena* (Zhou & Zheng, 1997)
Carebara obtusidentata (Xu, 2003)
Carebara polyphemus (Wheeler, 1928)
Carebara rectidorsa (Xu, 2003)
Carebara reticapita (Xu, 2003)
Carebara striata (Forel, 2003)
Carebara taiponica (Wheeler, 1928)
Carebara trechideros (Zhou & Zheng, 1997)
Carebara wheeleri (Ettershank, 1966)

***Cataulacus*:** 4 species

Cataulacus granulatus (Latreille, 1802)
 * *Cataulacus marginatus* Bolton, 1974
Cataulacus simoni Emery, 1893
Cataulacus taprobanae Smith, 1853

***Crematogaster*:** 25 species

Crematogaster anthracina Smith, 1857
 * *Crematogaster artifex* Mayr, 1879
Crematogaster binghamii Forel, 1904
Crematogaster biroi Mayr, 1897
 * *Crematogaster contemta* Mayr, 1879
Crematogaster dalyi Forel, 1902
Crematogaster dohrni Mayr, 1879
Crematogaster ebenina Forel, 1902
Crematogaster ferrarii Emery, 1888
Crematogaster hodgsoni Forel, 1902
 * *Crematogaster inflata* Smith, 1857
Crematogaster macaoensis Wu & Wang, 1995
Crematogaster matsumurai Forel, 1901
Crematogaster nawai Ito, 1914
Crematogaster osakensis Forel, 1900
Crematogaster politula Forel, 1902
 * *Crematogaster quadriruga* Forel, 1911
Crematogaster rogenhoferi Mayr, 1879
Crematogaster rothneyi Mayr, 1879
Crematogaster subnuda Mayr, 1879

Crematogaster travancorensis Forel, 1902

Crematogaster treubi Emery, 1896

Crematogaster walshi Forel, 1902

Crematogaster wroughtonii Forel, 1902

Crematogaster zoceensis Santschi, 1925

***Dilobocondyla*: 3 species**

* *Dilobocondyla eguchii* Bharti & Kumar, 2013

Dilobocondyla fouqueti Santschi, 1910

* *Dilobocondyla gasteroreticulata* Bharti & Kumar, 2013

***Erromyrmex*: 1 species**

Erromyrmex latinodis (Mayr, 1872)

***Gaoligongidris*: 1 species**

Gaoligongidris planodorsa Xu, 2012

***Gauromyrmex*: 1 species**

Gauromyrmex acanthinus (Karavaiev, 1935)

***Kartidris*: 3 species**

Kartidris ashima Xu & Zheng, 1995

Kartidris nyos Bolton, 1991

Kartidris sparsipila Xu, 1999

***Lasiomyrma*: 1 species (undescribed)**

Lasiomyrma sp.

***Lophomyrmex*: 3 species**

Lophomyrmex bedoti Emery, 1893

Lophomyrmex birmanus Emery, 1893

Lophomyrmex quadrispinosus (Jerdon, 1851)

***Lordomyrma*: 1 species (undescribed)**

Lordomyrma sp.

Meranoplus: 2 speices*Meranoplus bicolor* (Guérin-Méneville, 1844)*Meranoplus laeviventris* Emery, 1889***Messor***: 1 species* *Messor aciculatus* (Smith, 1874)***Monomorium***: 5 species*Monomorium chinense* Santschi, 1925*Monomorium floricola* (Jerdon, 1851)* *Monomorium hainanense* Wu & Wang, 1995*Monomorium orientale* Mayr, 1879*Monomorium pharaonis* (Linnaeus, 1758)***Myrmecina***: 5 species* *Myrmecina asiatica* Okido, Ogata & Hosoishsi, 2020* *Myrmecina asthena* Okido, Ogata & Hosoishsi, 2020*Myrmecina curvispina* Zhou, Huang & Ma, 2008*Myrmecina guangxiensis* Zhou, 2001* *Myrmecina sinensis* Wheeler, 1921*Myrmecina striata* Emery, 1889*Myrmecina taiwana* Terayama, 1995***Myrmica***: 11 species*Myrmica curiosa* Radchenko, Zhou & Elmes, 2008*Myrmica draco* Radchenko, Zhou & Elmes, 2008* *Myrmica excelsa* Kupyanskaya, 1990* *Myrmica heterorhytida* Radchenko & Elmes, 2008*Myrmica margaritae* Emery, 1889*Myrmica pleiorhytida* Radchenko & Elmes, 2009*Myrmica polyglypta* Radchenko & Rigato, 2008*Myrmica ritae* Emery, 1889*Myrmica serica* Wheeler, 1928*Myrmica sinensis* Radchenko, Zhou & Elmes, 2008*Myrmica titanica* Mayr, 2001*Myrmica yunnanensis* Radchenko & Elmes, 2008

Myrmicaria: 1 species

Myrmicaria brunnea Saunders, 1842

Perissomyrmex: 2 species

Perissomyrmex bidentatus Zhou & Huang, 2006

Perissomyrmex fissus Xu & Wang, 2004

Pheidole: 42 species

Pheidole allani Bingham, 1903

Pheidole binghamii Forel, 1902

Pheidole capellinii Emery, 1902

Pheidole constanciae Forel, 1902

Pheidole elongicephala Eguchi, 2008

Pheidole exasperata (Mayr, 1866)

Pheidole fervens Smith, 1858

Pheidole fervida Smith, 1874

* *Pheidole fortis* Eguchi, 2006

Pheidole gatesi (Wheeler, 1927)

* *Pheidole hongkongensis* Wheeler, 1928

Pheidole indica Mayr, 1879

* *Pheidole indosinensis* Wheeler, 1928

Pheidole jucunda Forel, 1885

* *Pheidole laevicolor* Eguchi, 2006

* *Pheidole magna* Eguchi, 2006

Pheidole multidentis Forel, 1902

Pheidole nietneri Emery, 1901

* *Pheidole nodifera* Smith, 1858

Pheidole nodus Smith, 1874

* *Pheidole ochracea* Eguchi, 2008

* *Pheidole parva* Mayr, 1865

Pheidole pieli Santschi, 1925

* *Pheidole plagiaria* Smith, 1860

* *Pheidole planifrons* Santschi, 1920

* *Pheidole rabo* Forel, 1913

Pheidole roberti Forel, 1902

* *Pheidole rugithorax* Eguchi, 2008

Pheidole sagei Forel, 1902

* *Pheidole singaporensis* Özdikmen, 2010

Pheidole sinica (Wu & Wang, 1992)

* *Pheidole smythiesii* Forel, 1902

Pheidole spathifera Forel, 1902
Pheidole sulcaticeps Roger, 1863
* *Pheidole tandjongensis* Forel, 1913
* *Pheidole tjibodana* Forel, 1905
* *Pheidole tumida* Eguchi, 2008
* *Pheidole vieti* Eguchi, 2008
* *Pheidole vulgaris* Eguchi, 2006
Pheidole watsoni Forel, 1902
Pheidole yeensis Forel, 1902
* *Pheidole zoceana* Santschi, 1925

Pristomyrmex: 4 species

Pristomyrmex brevispinosus Emery, 1887
Pristomyrmex hamatus Xu & Zhang, 2002
Pristomyrmex punctatus (Smith, 1860)
Pristomyrmex sulcatus Emery, 1895

Recurvidris: 3 species

* *Recurvidris kemneri* (Wheeler, 1954)
Recurvidris nuwa Xu & Zheng, 1995
Recurvidris recurvispinosa (Forel, 1890)

Rhopalomastix: 2 species

* *Rhopalomastix rothneyi* Forel, 1900
Rhopalomastix umbracapita Xu, 1999

Rotastruma: 1 species

* *Rotastruma stenocephs* Bolton, 1991

Solenopsis: 3 species

Solenopsis indagatrix Wheeler, 1928
Solenopsis invicta Buren, 1972 (**Exotic**)
Solenopsis jacoti Wheeler, 1923

Stenamma: 4 species

Stenamma ailaoense Liu & Xiu, 2011
Stenamma gurkhale DuBois, 1998

- * *Stenamma jeriorum* DuBois, 1998
- Stenamma wumengense* Liu & Xiu, 2011

***Strumigenys*: 24 species**

- Strumigenys ailaoshana* Xu & Zhou, 2004
- * *Strumigenys assamensis* De Andrade, 1994
- Strumigenys dayui* (Xu, 2000)
- * *Strumigenys doriae* Emery, 1887
- * *Strumigenys dyschima* (Bolton, 2000)
- Strumigenys exilirhina* Bolton, 2000
- Strumigenys feae* Emery, 1895
- * *Strumigenys kichijo* (Terayama, 1996)
- * *Strumigenys leptothrix* Wheeler, 1929
- Strumigenys lewisi* Cameron, 1886
- * *Strumigenys lyroessa* (Roger, 1862)
- * *Strumigenys membranifera* Emery, 1869 (**Exotic**)
- * *Strumigenys mitis* (Brown, 2000)
- Strumigenys mutica* (Brown, 1949)
- Strumigenys nanzanensis* Lin & Wu, 1996
- * *Strumigenys nepalensis* De Andrade, 1994
- Strumigenys nongba* (Xu & Zhou, 2004)
- * *Strumigenys paraposta* Bolton, 2000
- * *Strumigenys rallarhina* Bolton, 2000
- * *Strumigenys sauteri* (Forel, 1912)
- Strumigenys strygax* Bolton, 2000
- * *Strumigenys sydorata* Bolton, 2000
- * *Strumigenys taphra* (Bolton, 2000)
- * *Strumigenys tritomea* Bolton, 2000
- Strumigenys yangi* (Xu & Zhou, 2004)

***Temnothorax*: 7 species**

- Temnothorax angulohumerus* Zhou, 2010
- Temnothorax congruus* (Smith, 1874)
- Temnothorax hengshanensis* (Huang, 2004)
- Temnothorax nassonovi* (Ruzsky, 1895)
- Temnothorax orchidus* Zhou, 2010
- Temnothorax striatus* Zhou, 2010
- Temnothorax wui* (Wheeler, 1929)

***Tetramorium*: 29 species**

- Tetramorium aptum* Bolton, 1977

- Tetramorium bicarinatum* (Nylander, 1846)
Tetramorium cardiocarenum Xu & Zheng, 1994
Tetramorium ciliatum Bolton, 1977
Tetramorium crepum Wang & Wu, 1988
Tetramorium cuneinode Bolton, 1977
Tetramorium cyclolobium Xu & Zheng, 1994
* *Tetramorium difficile* Bolton, 1977
* *Tetramorium flavipes* Emery, 1893
Tetramorium indosinense Wheeler, 1927
Tetramorium insolens (Smith, 1861)
Tetramorium kheperra (Bolton, 1976)
Tetramorium kraepelini Forel, 1905
Tetramorium lanuginosum Mayr, 1870
Tetramorium laparum Bolton, 1977
Tetramorium nipponense Wheeler, 1928
Tetramorium nursei Bingham, 1903
Tetramorium obtusidens Viehmeyer, 1916
Tetramorium pacificum Mayr, 1870
* *Tetramorium parvispinum* (Emery, 1893)
* *Tetramorium polymorphum* Yamane & Jaitrong, 2011
Tetramorium repletum Wang & Xiao, 1988
Tetramorium simillimum (Smith, 1851) (**Exotic**)
Tetramorium smithi Mayr, 1879
* *Tetramorium tonganum* Mayr, 1870
Tetramorium walshi (Forel, 1890)
* *Tetramorium wroughtonii* (Forel, 1902)
Tetramorium yerburyi Forel, 1902
Tetramorium yulongense Xu & Zheng, 1994

***Trichomyrmex*:** 2 species

- Trichomyrmex destructor* (Jerdon, 1851) (**Exotic**)
Trichomyrmex mayri (Forel, 1902) (**Exotic**)

***Vollenhovia*:** 2 species

- * *Vollenhovia lucimandibula* Wang, 2005
Vollenhovia pyrrhoria Wu & Xiao, 1989

***Vombisidris*:** 1 species

- * *Vombisidris tibeta* Xu & Yu, 2012

PONERINAE***Anochetus***: 6 species

Anochetus graeffei Mayr, 1870

* *Anochetus madaraszi* Mayr, 1897

Anochetus mixtus Radchenko, 1993

* *Anochetus myops* Emery, 1893

Anochetus risii Forel, 1900

Anochetus subcoecus Forel, 1912

Brachyponera: 2 species

Brachyponera brevidorsa Xu, 1994

* *Brachyponera chinensis* (Emery, 1895)

Brachyponera luteipes (Mayr, 1862)

Buniapone: 1 species

Buniapone amblyops (Emery, 1887)

Centromyrmex: 1 species

Centromyrmex feae (Emery, 1889)

Cryptopone: 5 species

Cryptopone gigas Wu & Wang, 1995

Cryptopone recticlypea Xu, 1998

* *Cryptopone sauteri* (Wheeler, 1906)

Cryptopone taivanae (Forel, 1930)

Cryptopone testacea Emery, 1893

Diacamma: 1 species

* *Diacamma rugosum* (Le Guillou, 1842)

Ectomomyrmex: 8 species

Ectomomyrmex annamitus (André, 1892)

Ectomomyrmex astutus (Smith, 1858)

Ectomomyrmex javanus Mayr, 1867

Ectomomyrmex leeuwenhoekii (Forel, 1886)

Ectomomyrmex lobocarenum (Xu, 1995)

* *Ectomomyrmex obtusus* Emery, 1900

Ectomomyrmex sauteri (Forel, 1912)

Ectomomyrmex zhengi (Xu, 1995)

Emeryopone: 1 species

Emeryopone melaina Xu, 1998

Euponera: 1 species

Euponera pilosior (Wheeler, 1928)

Harpegnathos: 1 species

Harpegnathos venator (Smith, 1858)

Hypoponera: 7 species

Hypoponera ceylonensis (Mayr, 1897)

Hypoponera confinis (Roger, 1860)

* *Hypoponera ergatandria* (Forel, 1893) (**Exotic**)

Hypoponera nippona (Santschi, 1937)

Hypoponera punctatissima (Roger, 1859) (**Exotic**)

Hypoponera sauteri Onoyama, 1989

Hypoponera truncata (Smith, 1860)

Leptogenys: 17 species

Leptogenys binghamii Forel, 1900

Leptogenys birmana Forel, 1900

Leptogenys chinensis (Mayr, 1870)

Leptogenys crassicornis Emery, 1895

* *Leptogenys davydovi* Karavaiev, 1935

Leptogenys diminuta (Smith, 1857)

* *Leptogenys kitteli* (Mayr, 1870)

* *Leptogenys kraepelini* Forel, 1905

Leptogenys laozii Xu, 2000

Leptogenys lucidula Emery, 1895

Leptogenys mengzii Xu, 2000

Leptogenys pangui Xu, 2000

* *Leptogenys peuqueti* (André, 1887)

* *Leptogenys processionalis* (Jerdon, 1851)

* *Leptogenys rufida* Zhou, 2012

* *Leptogenys sunzii* Xu, 2015

Leptogenys zhuangzii Xu, 2000

Mesoponera: 1 species

Mesoponera melanaria (Emery, 1893)

Myopias: 3 species

Myopias conicara Xu, 1998

* *Myopias daia* Xu, 2014

* *Myopias hania* Xu, 2012

Odontomachus: 6 species

Odontomachus circulus Wang, 1993

* *Odontomachus fulgidus* Wang, 1993

Odontomachus granatus Wang, 1993

Odontomachus monticola Emery, 1892

Odontomachus rixosus Smith, 1857

Odontomachus tensus Wang, 1993

Odontoponera: 1 species

* *Odontoponera denticulata* (Smith, 1858)

Platythyrea: 2 species

Platythyrea clypeata Forel, 1911

* *Platythyrea parallela* (Smith, 1859)

Ponera: 14 species

Ponera alisana Terayama, 1986

Ponera baka Xu, 2001

Ponera bawana Xu, 2001

* *Ponera chiponensis* Terayama, 1986

Ponera diodonta Xu, 2001

Ponera longlina Xu, 2001

Ponera menglana Xu, 2001

Ponera nangongshana Xu, 2001

* *Ponera paedericera* Zhou, 2001

Ponera pentodontos Xu, 2001

Ponera pianmana Xu, 2001

Ponera scabra Wheeler, 1928

Ponera sinensis Wheeler, 1928

Ponera xantha Xu, 2001

***Pseudoneoponera*: 2 species**

Pseudoneoponera bispinosa (Smith, 1858)

Pseudoneoponera rufipes (Jerdon, 1851)

PROCERATIINAE

***Discothyrea*: 3 species**

* *Discothyrea banna* Xu, 2014

* *Discothyrea diana* Xu, 2014

Discothyrea sauteri Forel, 1912

***Probolomyrmex*: 1 species**

Probolomyrmex longiscapus Xu & Zeng, 2000

***Proceratium*: 4 species**

Proceratium longigaster Karavaiev, 1935

Proceratium longmenense Xu, 2006

* *Proceratium shohei* Staab, 2018

Proceratium zhaoi Xu, 2000

PSEUDOMYRMECINAE

***Tetraponera*: 12 species**

Tetraponera allaborans (Walker, 1859)

Tetraponera amargina Xu & Chai, 2004

Tetraponera attenuata Smith, 1877

Tetraponera binghami (Forel, 1902)

Tetraponera concava Xu & Chai, 2004

Tetraponera convexa Xu & Chai, 2004

Tetraponera furcata Xu & Chai, 2004

Tetraponera microcarpa Wu & Wang, 1990

Tetraponera nitida (Smith, 1860)

Tetraponera notabilis Ward, 2001

Tetraponera protensa Xu & Chai, 2004

Tetraponera rufonigra (Jerdon, 1851)

Discussion

Ants in the Hengduan Mountain region

Field inventories and data synthesis efforts are essential for our understanding of ant diversity in ‘hotspots’ that harbor most of Earth’s biodiversity. Our study represents new survey data from an understudied region. We produce the first ant species checklist from China’s Hengduan Mountains (130 species).

A majority of the ant species were only collected below 1500 m, consistent with the strong effect of elevation on ant diversity observed elsewhere (Suppl. material 1, Fig. S1). This also suggests that future sampling in low elevation areas may increase species detection. For example, the number of *Strumigenys* species recovered in this survey is relatively low compared to the overall richness of this genus. This could be because we have relatively few collection events at low elevations where many of these species are known to occur. Indeed, all six *Strumigenys* species were collected below 1000 m from only three independent Winkler sampling sites.

Many of the new records in our collection such as *Aenictus brevinodus*, *Camponotus bellus leucodiscus*, *Cataulacus marginatus*, *Crematogaster quadriruga*, *Dilobocondyla eguchi*, *Gnamptogenys quadrutinodules*, and *Strumigenys taphra* represent the northern-most records of their known distributional ranges. Species records such as *Aenictus brevinodus*, *Camponotus bellus leucodiscus*, *Camponotus keihitai*, *Cataulacus marginatus*, *Gnamptogenys quadrutinodules*, and *Strumigenys taphra* show a disjunction from the rest of their known distributions. It is unclear whether those records represent true biogeographic disjunctions, or sampling / taxonomic artifacts. Another potential reason could be that they were collected in the past, but have not been reported due to the lack of taxonomic infrastructure and species check lists from this region (Guénard et al. 2017). Additional inventories of ant diversity and taxonomic treatments are needed to answer these questions.

Despite the comparatively small area of China’s Hengduan Mountains that we explored for this inventory of myrmecofauna, we were able to collect 130 species, which accounts for more than 24 % of the total number of ant species ($N = 550$) for Yunnan province. Among them, more than 10% of the ant species that were collected in this survey represent new records for Yunnan province. Moreover, there are still more than 41 morphospecies (32% of the total collected) that we believe are undescribed and new to science. To date, three *Myrmecina* species (Figs 82–84) and one *Gauromyrmex* species (Fig. 75) are undergoing taxonomic revision, and species descriptions are being prepared.

Our sampling of the full ant diversity of the Hengduan mountain region is still relatively limited. For example, we only had one sampling site per elevation, which is insufficient to cover the complex topology of the Hengduan Mountains. We also only used leaf litter extraction and hand collection, which is unlikely to recover complete ant assemblages. The incorporation of additional sampling techniques into our methodology, such as pitfall trapping, soil baiting, twig sampling, light trapping and canopy fogging, will cover more strata and lifestyles, and thus significantly increase our rate of species discovery. Overall, our results highlight how little was previously known about

the ant fauna in this region and emphasize the need for further collecting in order to better understand the hidden ant biodiversity in China's Hengduan Mountains, and Yunnan Province overall.

Ants in Yunnan

If the total species richness of ants in Yunnan, with 550 species, is still an underestimate of the full species numbers, the exceptional diversity of genera encountered in this region needs to be highlighted. With 99 genera, Yunnan generic diversity is only matched globally by a few regions in South East Asia, and Queensland, Australia. A major difference with other Asian regions lies in the composition of the genera retrieved and their origin. For instance, genera found in Borneo, Sumatra, Java, Vietnam, Thailand, Peninsular Malaysia are almost exclusively derived from tropical, Oriental origins. In contrast, the geographic location and topography of Yunnan province has promoted an intermixing of taxa from several biogeographic regions: the Oriental realm from the south, the Palearctic realm from the northwest, and the Sino-Japanese realm from the northeast. As a result, the composition of the Yunnan ant fauna includes both tropical, subtropical, and temperate elements. Such intermixed communities are evident even at a small scale. For instance, during previous fieldwork conducted in the Gaoligongshan Mountains in 2015 by two of the authors (BG and CL), for which specimens were unfortunately lost, the coexistence of tropical (*Dorylus*, *Ectomomyrmex*), subtropical (*Temnothorax*) and temperate genera (*Formica*, *Lasius*) was observed on a hillside at an elevation of about 1900 m on an ~ 250 m² patch of grassland. Interestingly, while this area exhibited a transition where fauna from distinctly different origins coexisted along a thin band of altitude, at lower elevations, tropical genera were dominant and at higher elevations, temperate genera became dominant. Overall, this generated an unexpectedly diverse faunal composition, with such mixed communities contemplated by Wheeler (1915) to explain the generic composition and diversity of fossil ants observed in Baltic amber. Possibly, the ant composition of genera now retrieved within Yunnan might represent the remains of a once more widespread assemblage found within Asia and Europe during the Miocene (Guénard et al. 2015). This highlights the specific nature of the Yunnan ant fauna and its importance in studying ant biogeography within Asia. It also serves as an excellent example of the formation and stability of ant community assemblages over time. Other neighboring regions such as Myanmar, Bhutan, Nepal or northeast India are likely to exhibit similar features, but to this point, the myrmecological exploration of these regions has been largely fragmentary (Guénard et al. 2010, 2012).

The diversity of Yunnan ants is also remarkable for particular ant genera for which their global peak of diversity is encountered in the region. While it is important to note that the global diversity of specific genera as well as their overall taxonomic descriptions remain incomplete, seven genera present their highest currently known global diversity in Yunnan (*Cryptopone*: 5 species, *Ectomomyrmex*: 8 species, *Kartidris*: 3 species, *Perissomyrmex*: 2 species, *Ponera*: 14 species, *Prenolepis*: 7 species, *Stigmatomma*: 11 species), while six others are remarkable by the level of global diversity there, among

the highest observed globally (*Aenictus*: 19 species, *Carebara*: 19 species, *Dilobocondyla*: 3 species, *Myrmecina*: 7 species, *Proceratium*: 4 species, *Recurvidris*: 3 species).

In conclusion, the important topographic variation, with mountain ranges aligned along a north-south axis combined with the presence of multiple climatic zones, including tropical rainforest in the lowland areas of the southern part of Yunnan create a diversity of microhabitats for supporting a diverse ant fauna. Moreover, the geographic position of Yunnan at the confluence of three biogeographic realms may promote ant diversity in the region. The collection of these 16 new ant records for Yunnan together with our previous discovery of 40 new ant records for Yunnan (Liu et al. 2015a) suggest that the true ant diversity in Yunnan is significantly higher. Moreover, the species diversity of some ant genera in nearby regions (based on data from GABI) also suggests that some ant genera sampled will ultimately be much more diverse in Yunnan (Guénard et al. 2017). For example, Hong Kong has recorded a similar diversity of *Strumigenys* species while having an area nearly 350 times smaller and a much less diverse topography compare to Yunnan (Tang et al. 2019), perhaps because leaf litter extraction has not been widely used for sampling ants in Yunnan. Thus, our survey to date indicates that further intensive sampling focused on different ecological strata (arboreal, leaf litter, subterranean) and combining various methods of extraction in both tropical and mountain habitats should yield many additional records and new species discovery in this region.

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Supplementary material I

Figure S1. Ant species richness pattern along an elevational gradient in the Hengduan Mountains

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Data type: Image

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